

## **ART: COMPLICAZIONI**

- **OHSS**
- **Lesioni traumatiche da ago**
  - vascolari
  - intestinali
  - urinarie
- **Infezioni**
- **Complicazioni anestesilogiche**

## **OVARIAN HYPERSTIMULATION SYNDROME (OHSS)**

- **La più temibile delle complicazioni**
- **Iatrogena, da farmaci induttori la superovulazione**

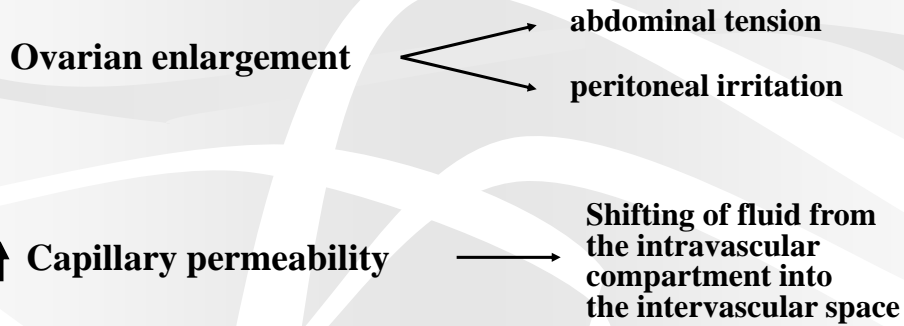
## **OHSS INCIDENCE**

	<b>Mild</b>	<b>Moderate</b>	<b>Severe</b>
<b>Review 1965-1974</b> <b>(Schenker and Weistein, 1978)</b>	<b>8-23%</b>	<b>0.005-7%</b>	<b>0.008-10%</b>
<b>Review 1987-1994</b> <b>(Bassil et al, 1995)</b>	<b>----</b>	<b>1-6%</b>	<b>0.1-4%</b>

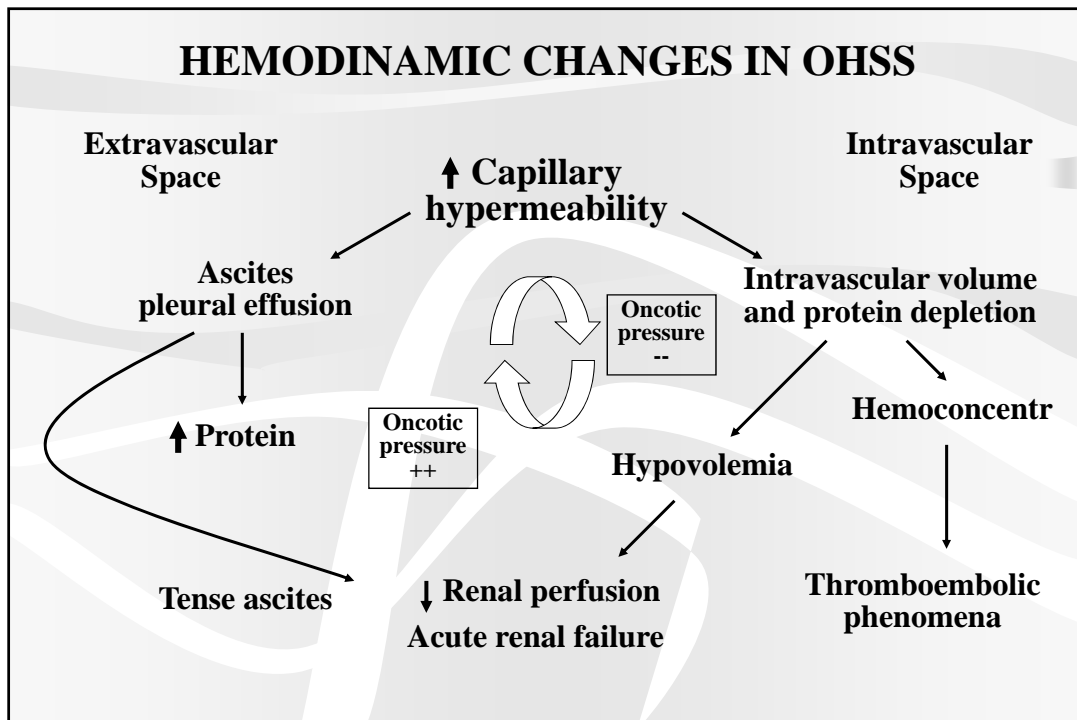
## **OHSS**

- **Quadro clinico**
- **Patogenesi**
- **Prevenzione**
- **Terapia**

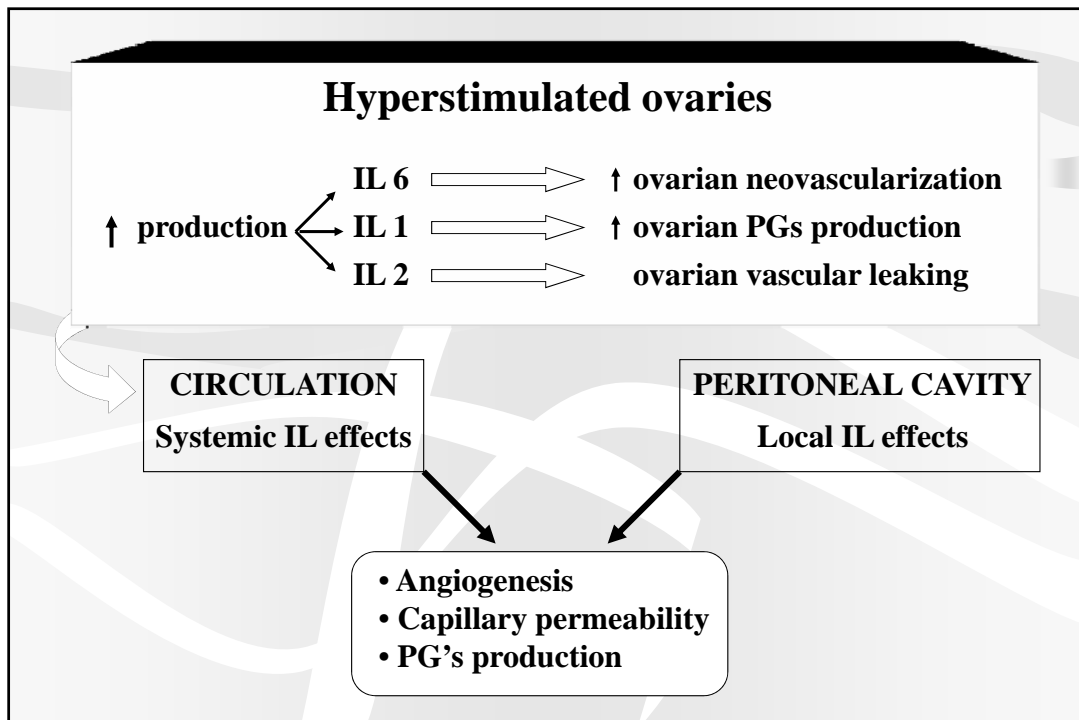
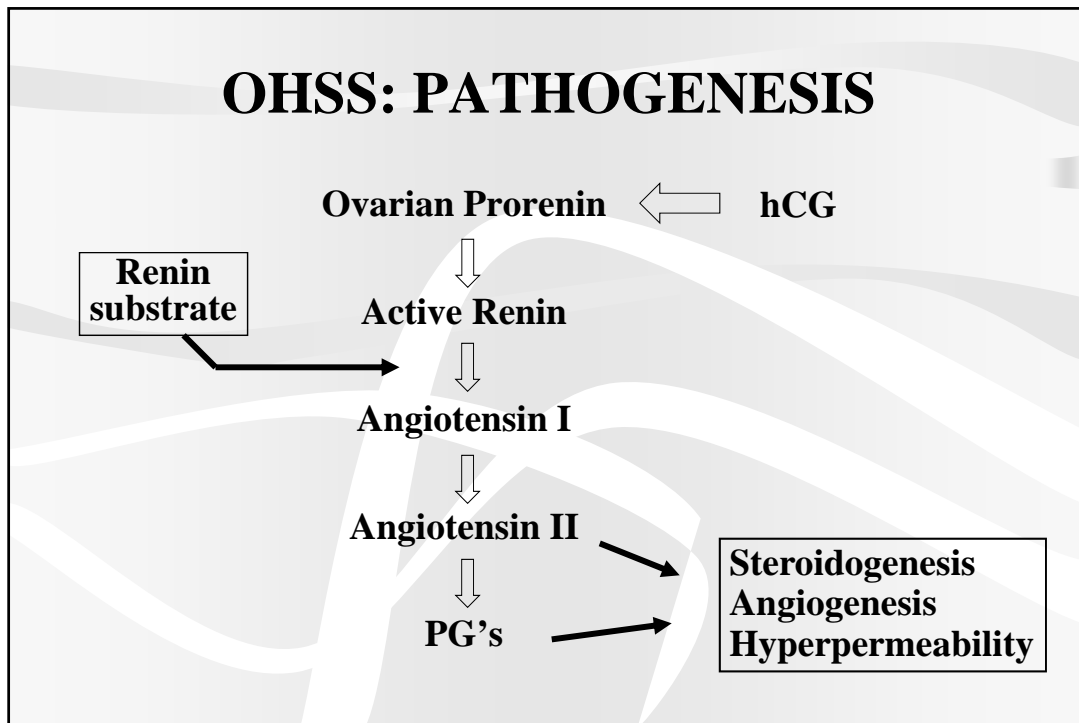
# OHSS CLINICAL SYMPTOMS

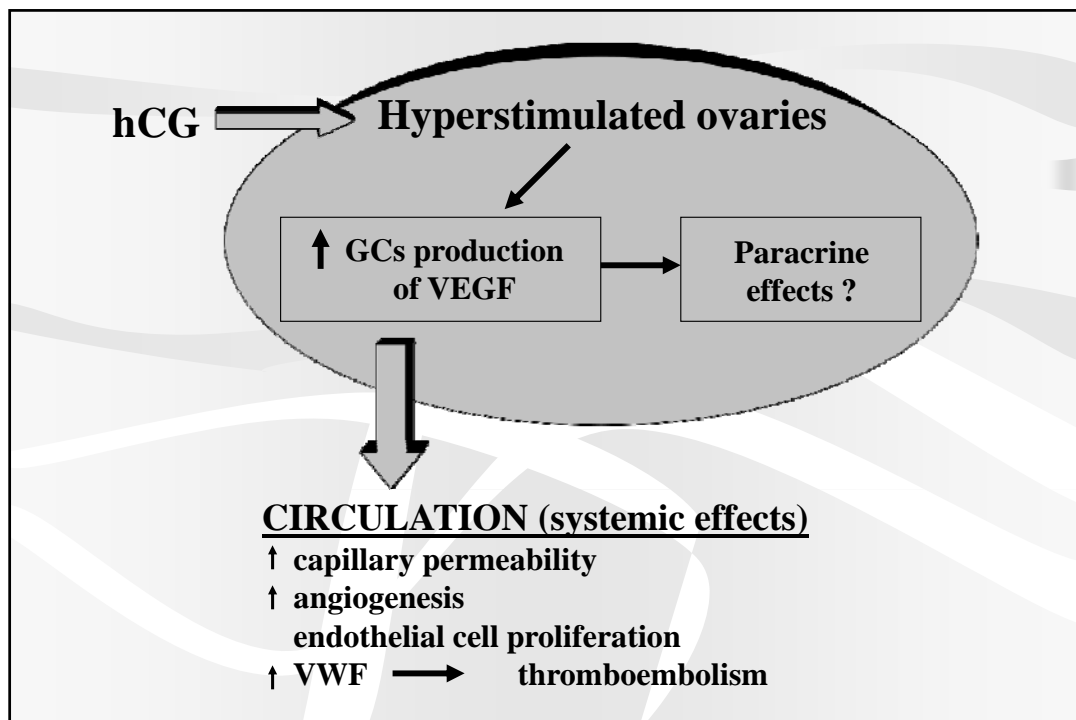


## HEMODYNAMIC CHANGES IN OHSS



# OHSS: PATHOGENESIS





## Classification of OHSS

	Size ovaries	Symptoms
<b>MILD</b>	5-10 cm	Grade 1: abdominal tension and discomfort Grade 2: grade 1 signs plus nausea, vomiting and/or diarrhea
<b>MODERATE</b>	>10 cm	Grade 3: grade 2 signs plus ultrasound evidence of ascites
<b>SEVERE</b>	>12 cm	Grade 4: grade 3 signs plus clinical evidence of ascites and/or pleural effusion and dyspnea Grade 5: grade 4 signs plus hemoconcentration increased blood viscosity, hypovolemia decreased renal perfusion, oliguria

**Golan, 1989**

## Classification of OHSS

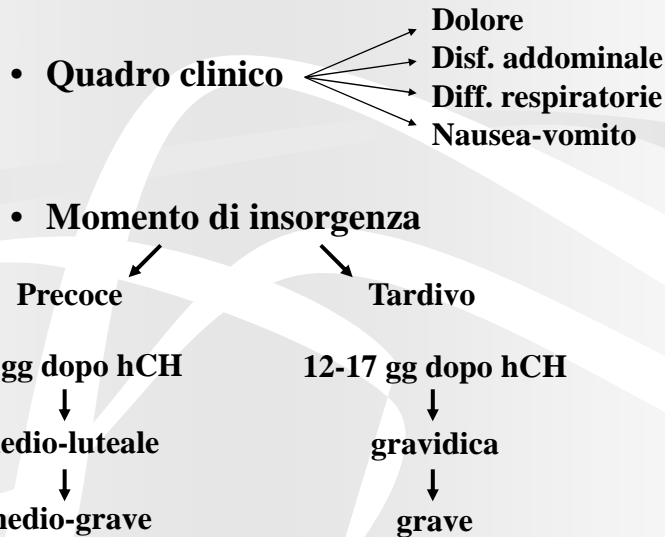
Severe OHSS	Critical OHSS
<p><b>Variable enlarged ovary</b>  <b>Massive ascites ± hydrotorax</b>  <b>Hct &gt; 45%</b>  <b>WBC &gt; 15.000</b>  <b>Oliguria</b>  <b>Creatinine 1.0-1.5</b>  <b>Creatinine clearance ≥ 50mL/min</b>  <b>Liver dysfunction</b>  <b>Anasarca</b></p>	<p><b>Variable enlarged ovary</b>  <b>Tense ascites ± hydrotorax</b>  <b>Hct &gt; 55%</b>  <b>WBC &gt; 35.000</b>    <b>Creatinine ≥ 1.6</b>  <b>Creatinine clearance &lt; 50mL/min</b>  <b>Renal failure</b>  <b>Thromboembolic phenomena</b>  <b>ARDS</b></p>
<p>Navot, 1992</p>	

## OHSS INCIDENCE IN RELATION TO PATIENT'S AGE AND PCO DISEASE

	Patients age (yrs)			PCO disease	
	≤29	30-37	≥38	yes	no
<b>No of cycles</b>	<b>612</b>	<b>1844</b>	<b>668</b>	<b>81</b>	<b>3043</b>
<b>No of severe OHSS</b>	<b>10</b>	<b>9</b>	<b>1</b>	<b>3</b>	<b>17</b>
<b>(%)</b>	<b>1.6</b>	<b>0.5</b>	<b>0.15</b>	<b>3.7</b>	<b>0.6</b>

Ferraretti AP, 1997

## DIAGNOSI



## RISK FACTORS ASSOCIATED WITH OHSS

High risk	Low risk
<p>Young (&lt; 35 years)</p> <p>PCO-like</p> <p>Asthenic habitus</p> <p>High serum E<sub>2</sub> (&gt; 4000 pg/ml)</p> <p>Multiple follicles (&gt; 35)</p> <p>“Necklace” signs</p> <p>Pregnancy</p> <p>hCG luteal supplementation</p> <p>GnRH-a protocol</p>	<p>Old (&gt; 36 years)</p> <p>Hypogonadotrophic</p> <p>Heavy build</p> <p>Low serum E<sub>2</sub> (≤ 4000 pg/ml)</p> <p>Few mature follicles (&lt; 20)</p> <p>Quiescent ovary</p> <p>Barren cycle</p> <p>Progesterone or no supplementation</p> <p>CC and/or hMG protocol</p>

**THE hCG ADMINISTRATION  
IS REQUIRED FOR THE OHSS  
TO DEVELOP**



**WITHHOLDING THE hCG INJECTION  
MEANS CANCELLATION OF THE  
CYCLE SINCE MATURE OOCYTES  
CANNOT BE RETRIEVED**

### **STRATEGIE PER PREVENIRE O RIDURRE IL RISCHIO DI OHSS**

- **Discontinuazione della somministrazione di gonadotropine (COASTING) (Forman 1990, Sher 1993)**
- **Usò perioperatorio di cristalloidi (Asch, 1993)**
- **Criopreservazione di tutti gli embrioni e cancellazione dei transfers di gameti ed embrioni freschi (Amso, 1990)**
- **Evitare la supplementazione luteale con hCG (Araujo, 1995)**
- **Usare GnRH-a e non hCG per indurre la finale maturazione ovocitaria (Gonen 1990, Segal 1992)**

## **PREVENTION AND TREATMENT PROTOCOL FOR OHSS (1)**

Navot D, 1997

**Day 1:** - prior to initiation of menotrophins

- prolong GnRH-a administration if PCOD or multifollicular ovaries
- initiate menotrophins at minimal effective dose
- reassess risk profile and educate and confirm consent in writing

**Day 3:** - initiate menotrophins, continue GnRH-a

**Day 6:** - measure serum  $E_2$  and perform follicular study

- reduce menotrophins if  $E_2$  is  $>250$  pg/ml

**Day 8:** - measure serum  $E_2$  and perform follicular study

- reduce menotrophins if  $E_2$  is  $>1200$  pg/ml and/or  $>20$  follicles develop

**Day 10:** - measure serum  $E_2$  and perform follicular study

- reduce menotrophins if  $E_2$  is  $>3000$  pg/ml and/or  $>20$  follicles develop
- start coasting if  $E_2$  is  $>4000$  and leading follicles are  $\geq 14$ -15mm

## **PREVENTION AND TREATMENT PROTOCOL FOR OHSS (2)**

Navot D, 1997

**Day 11-12:** - administer hCG at 10.000 IU if  $E_2$  is  $<3.000$  pg/ml and  $\geq 4$  follicles are  $\geq 16$  mm

- administer hCG at 5.000 IU if  $E_2$  is 3.000-4000 pg/ml
- coast if  $E_2$  is  $>4.000$  provided lead follicles are  $\geq 13$ -14 mm
- continue coasting while GnRH-a is continued until  $E_2$  is  $\leq 3.000$
- administer GnRH-a for  $E_2$  values  $\geq 2.000$  during OI or  $\geq 4.000$  during COH in non down regulated cycles

**hCG+2: (DAY OF FOLLICULAR ASPIRATION)**

- consider follicular aspiration if OI and  $E_2$  is  $\geq 2.000$ -3.000 pg/ml
- aspirate all follicles at all sizes if  $E_2$  is  $\geq 3.000$  pg/ml
- administer intravenous albumin when  $E_2$  is  $\geq 4.000$  pg/ml and/or  $>30$  oocytes retrieved

**PREVENTION AND TREATMENT PROTOCOL FOR OHSS (3)**  
Navot D, 1997

**hCG+(4-5): DAY OF EMBRYO TRANSFER (ET)**

- freeze all preembryos if  $E_2$  on day of hCG was  $\geq 6.000$ , defer ET
- discuss with the couple cryopreservation of all embryos and deferral of ET for  $E_2$  values of  $\geq 4.000$  pg/ml
- advise copious drinking (Gatorade) and attention to urine output and weight gain

**hCG+(7-8): DAY OF PEAK OVARIAN STIMULATION**

- monitor as clinically relevant; serum  $E_2$ ; Hct; electrolytes; kidney functions and US if symptomatic OHSS, treat according to indications

**PREVENTION AND TREATMENT PROTOCOL FOR OHSS (4)**  
Navot D, 1997

**ET+(6-8): DAY OF ENDOGENOUS hCG PERCEPTION**

- monitor as clinically relevant; serum  $E_2$ ; beta-hCG; Hct; electrolytes; kidney functions and US if symptomatic OHSS, treat according to indications

**ET+12: Onset of period if not pregnant and fast relief of all signs and symptoms of OHSS**

- further deterioration of OHSS if conceptual cycle. To be treated by judicious fluid and electrolyte replacement, i.v. albumin, dopamin drip or paracentesis.

## **TRATTAMENTO**

- **Sintomatico**
- **Ospedalizzazione**
  - **Hct**
  - **Ascite**

## **HOSPITALIZATION (Moderate and severe OHSS)**

### **Monitoring during hospitalization**

#### **Clinical signs**

- **Body weight**
- **Abdominal girth**
- **Fluid balance**
  - **Fluid intake**
  - **Urine output**

#### **Laboratory**

- **Complete blood count**
- **Electrolyte**
- **Total protein/albumin**
- **Clotting parameters**
- **Kidney function test**
- **Liver function test**

## HOSPITALIZATION (Moderate and severe OHSS)

<b>General measures (bed rest, antiemetics/analgetics)</b>	
<b>Intravascular volume depletion</b>	<b>→ Balanced parenteral fluid → Improvement</b> 1. Crystalloids (Normal saline) 2. Colloids (Albumin)
<b>plus tense ascites</b>	<b>→ abdominal paracentesis → Improvement</b>
<b>plus severe complications</b>	<b>→ 1. Intensive care management</b> <b>2. Specific measures</b> - Impaired renal function → Dopamine - Thromboembolis → Heparin - ARDS → Respiratory
<b>Surgical complications (rupture, torsion, ectopic)</b>	<b>→ Conservative (hemostatic) surgical management (laparoscopic)</b>

## TREATMENT

- |   |   |                            |
|---|---|----------------------------|
| <ul style="list-style-type: none"> <li>• Ht &gt; 40%</li> <li>• Diuresis &gt; 500cc/24h</li> </ul>  | } | <b>Albumine</b>            |
| <ul style="list-style-type: none"> <li>• Ht &lt; 40%</li> <li>• Diuresis = 300-500cc/24h</li> </ul> | } | <b>Albumine+Furosemide</b> |
| <ul style="list-style-type: none"> <li>• Ht ≥ 45%</li> <li>• Diuresis &lt; 500cc/24h</li> </ul>     | } | <b>Dopamine+Albumine</b>   |

## MAJOR SYMPTOMS AND SIGNS OF SEVERE AND CRITICAL OHSS AND TREATMENT MODALITIES

	Crystalloids	Albumin	Paracentesis	Lasix	Dopamine	Interruption of pregnancy
<b>Severe OHSS</b>						
<b>Na K</b>	+					(-)
<b>Liver disfunction</b>	+					
<b>Hemoconcentration</b>	+	+		(-)		(-)
<b>Hct &gt;45%</b>						
<b>Ascites</b>	+	+				(-)
<b>Pleural effusion</b>	+	+	+	+		(-)
<b>Dyspnea</b>	+	+	+	+		(-)
<b>Oliguria</b>	+	+	+	+		(-)
<b>Creatinine <math>\geq 1.0</math></b>	+	+	+	(-)		
<b>Critical OHSS</b>						
<b>Tense ascites</b>	+	+	+	+		(-)
<b>Impending or Frank</b>	+	+	+	(-)		+
<b>Renal failure</b>						
<b>Thromboembolis</b>	+	+	+	(-)	+	+