

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**

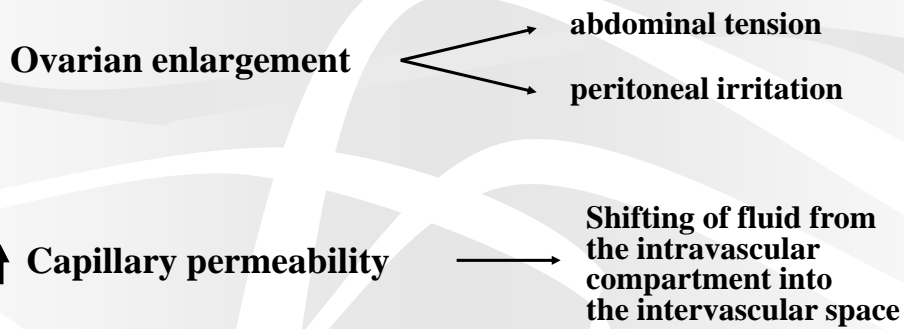
OHSS INCIDENCE

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

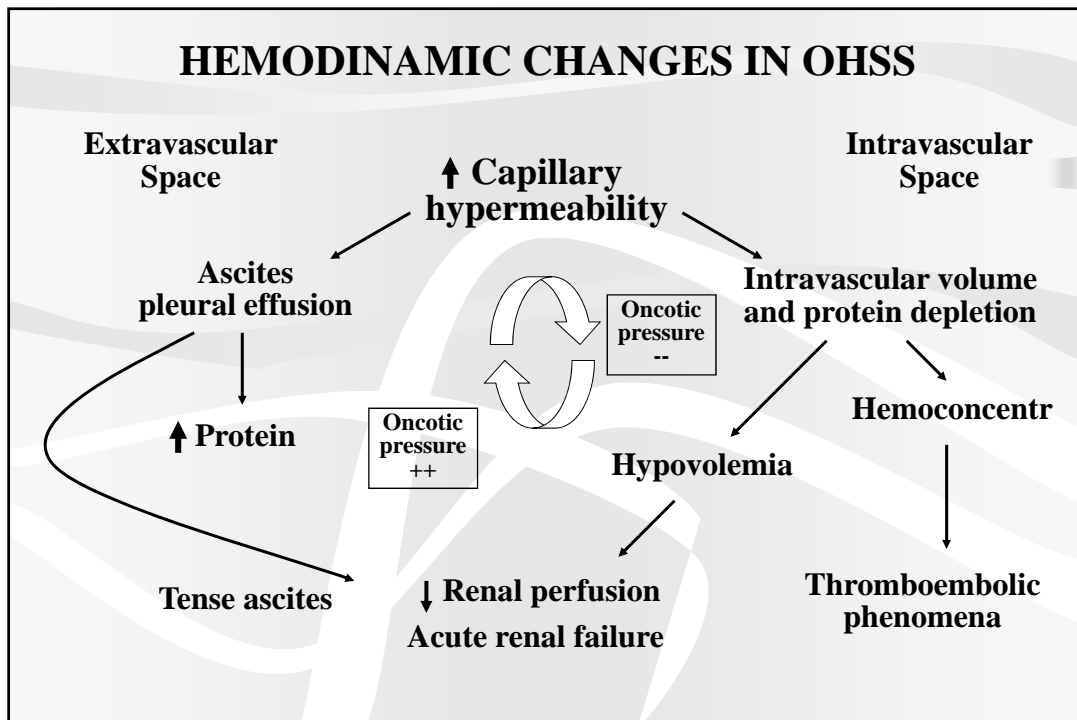
OHSS

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

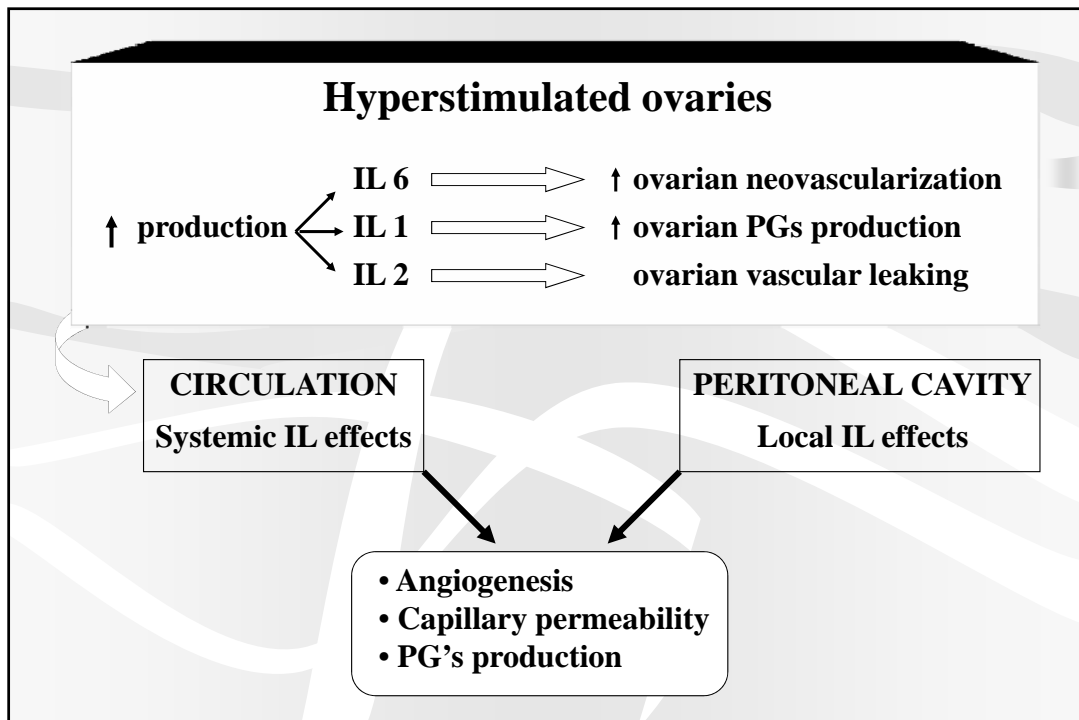
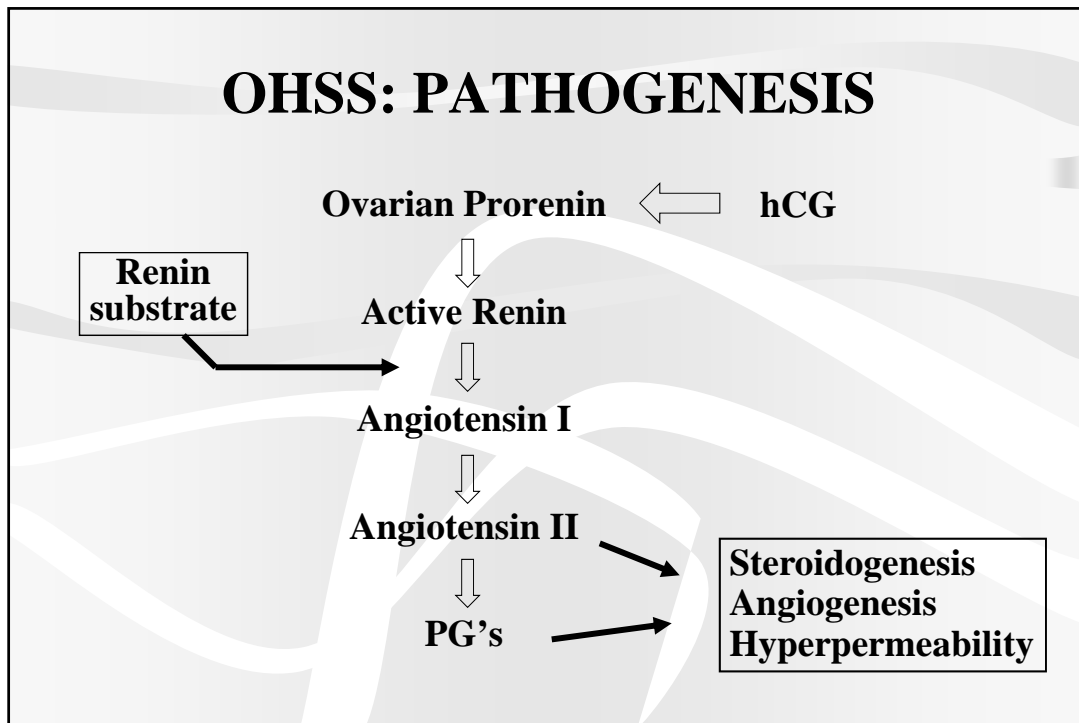
OHSS CLINICAL SYMPTOMS

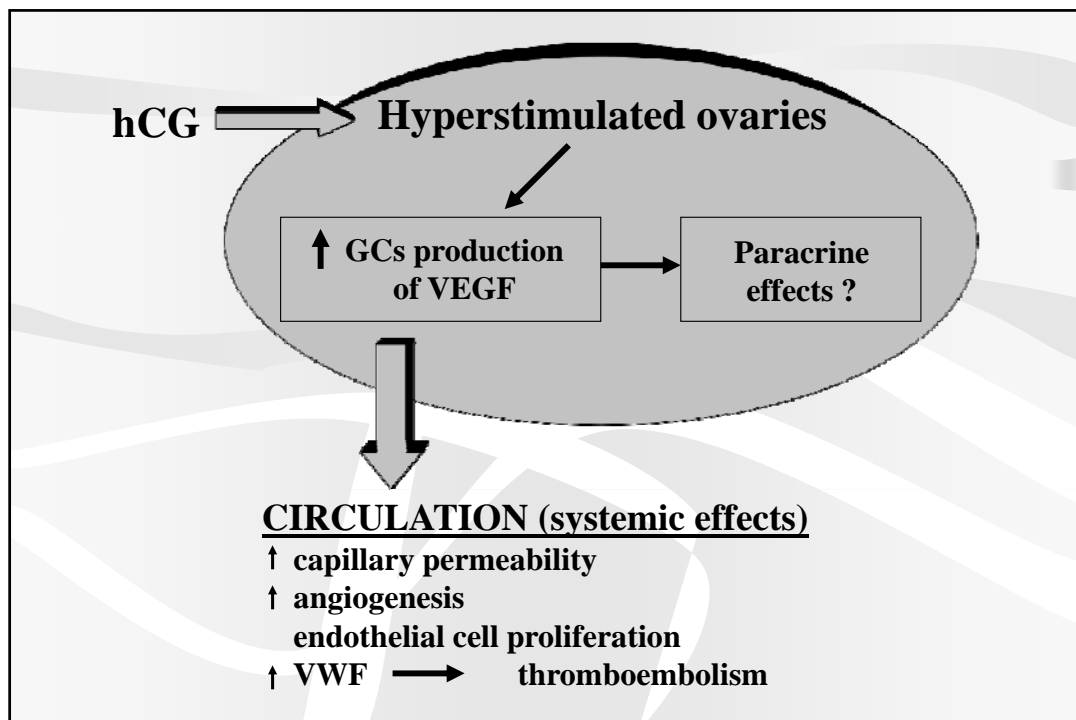


HEMODYNAMIC CHANGES IN OHSS



OHSS: PATHOGENESIS





Classification of OHSS

| | Size ovaries | Symptoms |
|-----------------|--------------|--|
| MILD | 5-10 cm | Grade 1: abdominal tension and discomfort Grade 2: grade 1 signs plus nausea, vomiting and/or diarrhea |
| MODERATE | >10 cm | Grade 3: grade 2 signs plus ultrasound evidence of ascites |
| SEVERE | >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

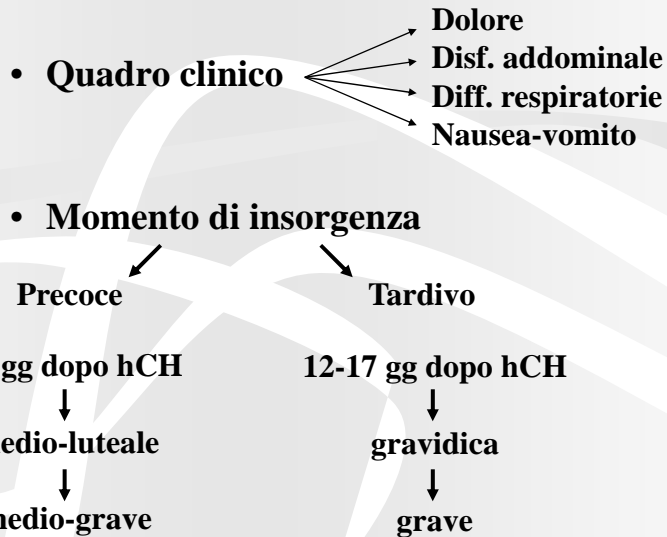
| Severe OHSS | Critical OHSS |
|--|---|
| <p>Variable enlarged ovary Massive ascites ± hydrotorax Hct > 45% WBC > 15.000 Oliguria Creatinine 1.0-1.5 Creatinine clearance ≥ 50mL/min Liver dysfunction Anasarca</p> | <p>Variable enlarged ovary Tense ascites ± hydrotorax Hct > 55% WBC > 35.000 Creatinine ≥ 1.6 Creatinine clearance < 50mL/min Renal failure Thromboembolic phenomena ARDS</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 |
| No of cycles | 612 | 1844 | 668 | 81 | 3043 |
| No of severe OHSS | 10 | 9 | 1 | 3 | 17 |
| (%) | 1.6 | 0.5 | 0.15 | 3.7 | 0.6 |

Ferraretti AP, 1997

DIAGNOSI



RISK FACTORS ASSOCIATED WITH OHSS

| High risk | Low risk |
|---|--|
| <p>Young (< 35 years)</p> <p>PCO-like</p> <p>Asthenic habitus</p> <p>High serum E₂ (> 4000 pg/ml)</p> <p>Multiple follicles (> 35)</p> <p>“Necklace” signs</p> <p>Pregnancy</p> <p>hCG luteal supplementation</p> <p>GnRH-a protocol</p> | <p>Old (> 36 years)</p> <p>Hypogonadotrophic</p> <p>Heavy build</p> <p>Low serum E₂ (≤ 4000 pg/ml)</p> <p>Few mature follicles (< 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)**
- **Uso 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 ≥ 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 ≥ 4 follicles are ≥ 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 ≥ 13 -14 mm
- continue coasting while GnRH-a is continued until E_2 is ≤ 3.000
- administer GnRH-a for E_2 values ≥ 2.000 during OI or ≥ 4.000 during COH in non down regulated cycles

hCG+2: (DAY OF FOLLICULAR ASPIRATION)

- consider follicular aspiration if OI and E_2 is ≥ 2.000 -3.000 pg/ml
- aspirate all follicles at all sizes if E_2 is ≥ 3.000 pg/ml
- administer intravenous albumin when E_2 is ≥ 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 ≥ 6.000 , defer ET
- discuss with the couple cryopreservation of all embryos and deferral of ET for E_2 values of ≥ 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)

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

TREATMENT

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

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

| | Crystalloids | Albumin | Paracentesis | Lasix | Dopamine | Interruption of pregnancy |
|---|--------------|---------|--------------|-------|----------|---------------------------|
| Severe OHSS | | | | | | |
| Na K | + | | | | | (-) |
| Liver disfunction | + | | | | | |
| Hemoconcentration | + | + | | (-) | | (-) |
| Hct >45% | | | | | | |
| Ascites | + | + | | | | (-) |
| Pleural effusion | + | + | + | + | | (-) |
| Dyspnea | + | + | + | + | | (-) |
| Oliguria | + | + | + | + | | (-) |
| Creatinine ≥ 1.0 | + | + | + | (-) | | |
| Critical OHSS | | | | | | |
| Tense ascites | + | + | + | + | | (-) |
| Impending or Frank | + | + | + | (-) | | + |
| Renal failure | | | | | | |
| Thromboembolis | + | + | + | (-) | + | + |