ASSISTED CONCEPTION
TECHNIQUES
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Objectives

• Know the indications of IVF
• Understand the steps of IVF
• Learn about ovarian hyperstimulation syndrome & its management
In vitro fertilization and embryo transfer (IVF-ET) involves the fertilization of gametes in the laboratory and transfer of embryos to the uterus.
• There are a number of related techniques that are carried out to overcome barriers to enhance fertilization:

• Intracytoplasmic sperm injection (ICSI)
• Testicular biopsy
• Percutaneous epididymal sperm aspiration (PESA)
• Donor Insemination (DI)
Indications of IVF include:

- Tubal damage
- Unexplained infertility
- Severe endometriosis
- PCOS
- Moderate & severe male factor: non-obstructive azoospermia
- Obstructive azoospermia
- Unsuccessful IUI
The success rate of IVF per cycle is about 30 per cent in women under 35 years of age.

**Typical IVF-ET cycle:**

I. Initial consultation and tests:
Assess the cause of infertility, explain the procedure, side effects, complications and success rates. An assessment of ovarian reserve by antimullarian hormone AMH, FSH, estradiol & ultrasound measure of antral follicle count.
II. Pituitary down regulation: To prevent the risk of spontaneous LH surge necessitating unplanned oocyte collection. Using GnRH analogues, different protocols are available using agonist or antagonist drugs according to patient characteristics.
III. Ovarian stimulation: FSH (either recombinant or urinary) or human menopausal gonadotrophins injections:
try to get about 8-10 eggs (18 mm)

IV. Ovulation trigger with hCG: 5000-10000 IU

V. Oocyte collection is carried out 34-36 hours after hCG administration
**Oocyte collection:**

the eggs are collected using an ultrasound guided procedure via a very fine needle.
Egg retrieval
VI. Semen preparation
Sperm aspiration techniques:
VII. Insemination:
Conventional IVF or ICSI
VIII. Fertilization and embryo cleavage: Embryos are graded microscopically from I to IV, with I being excellent and IV being poor.
IX. Embryo transfer: Embryos are normally transferred to the uterus 2-5 days after oocyte collection.
Embryo cryopreservation
X. Luteal support and establishment of pregnancy: supported by progesterone transvaginal with or without IM injections

- A blood test for hCG is performed 14 days after embryo transfer.
Complications of IVF treatment

- Ovarian hyperstimulation syndrome
- multiple pregnancy
Ovarian hyperstimulation syndrome

• This syndrome is characterized by ovarian enlargement due to multiple ovarian cysts and an acute fluid shift into the extravascular space.

• Complications of OHSS include ascites, hemoconcentration, hypovolemia, and electrolyte imbalances.
OHSS is a systemic disease resulting from vasoactive products released by hyperstimulated ovaries

The pathophysiology:

- increased capillary permeability,
- leakage of fluid from the vascular compartment
- third space fluid accumulation
- intravascular dehydration
capillary permeability ↑

vascular compartment

- hypovolaemia → albumin ↓
- haemoconcentration
- hypotension
- renal perfusion

extravascular compartment

- shift

- oedema
- ovarian volume ↑
- ascites
- hydrothorax

- weight ↑
- cysts
- swollen abdomen
- dyspnoea
• Incidence:
• mild forms of OHSS affect up to 33% of in vitro fertilisation (IVF) cycles
• moderate or severe OHSS affect 3–8% of IVF cycles
Diagnosis of OHSS

- history of ovarian stimulation, mostly by gonadotrophins, followed by the typical symptoms of abdominal distension, abdominal pain, nausea and vomiting.

Differential diagnoses:

- complication of an ovarian cyst (torsion, haemorrhage)
- pelvic infection
- intra-abdominal haemorrhage
- ectopic pregnancy
- appendicitis
Assessing severity and reporting adverse outcomes

- Women with OHSS should have the severity of their condition assessed and documented as an aid to management.
- **Mild OHSS:**
  - Abdominal bloating
  - Mild abdominal pain
  - Ovarian size usually <8 cm³

- **Moderate OHSS:**
  - Moderate abdominal pain
  - Nausea ± vomiting
  - Ultrasound evidence of ascites
  - Ovarian size usually 8–12 cm³*
• Severe OHSS:
  • Clinical ascites (occasionally hydrothorax)
  • Oliguria
  • Haemoconcentration, haematocrit >45%
  • Hypoproteinaemia
  • Ovarian size usually >12 cm³

• Critical OHSS:
  • Tense ascites or large hydrothorax
  • Haematocrit >55%
  • White cell count >25 000/ml
  • Oligo/anuria
  • Thromboembolism
  • Acute respiratory distress syndrome
• OHSS classified into ‘early’ and ‘late’, depending on the time of onset, determine the prognosis.

• OHSS presenting within 9 days after the ovulatory dose of hCG is likely to reflect excessive ovarian response and the precipitating effect of exogenous hCG.

• OHSS presenting after this period reflects endogenous hCG stimulation from an early pregnancy. Late OHSS is more likely to be severe and to last longer than early OHSS.
Treatment

• mild & moderate OHSS: can be managed on an outpatient basis.

• Analgesia: paracetamol or codeine. Nonsteroidal anti-inflammatory drugs should not be used.

• Women encouraged to drink to thirst, rather than to excess.

• Strenuous exercise and sexual intercourse should be avoided for fear of injury or torsion of hyperstimulated ovaries.

• continue progesterone luteal support but hCG luteal support is inappropriate.
• Severe OHSS: Hospital admission should be recommended & observation until resolution of the condition.
• Critical OHSS should prompt consideration of the need for intensive care.
• Strict fluid balance: Allowing women to drink according to their thirst
• Paracentesis: if distress due to abdominal distension or if oliguria persists despite adequate volume replacement.
• Intravenous colloid replacement if large volumes of ascitic fluid drained.
• Thromboprophylaxis should be provided for all women admitted to hospital with OHSS.
• Pelvic surgery should be restricted to cases with adnexal torsion.