

## IVF Outline

- Using ultrasound for infertility
  - Evaluate:
    - Cervix – length, competence
    - Uterus – shape, echogenicity
    - Endometrium – thickness, shape
    - Fallopian tubes – hydrosalpinx, patency
    - Ovaries – follicles
  - Cervix
    - Hysterosalpingography (HSG)
    - 1mm at internal os is ideal
  - Uterus
    - Check for congenital anomalies
    - Evaluate for submucosal fibroids
  - Endometrium
    - Thickness
      - 6mm AP is ideal in long plane (EV)
    - Saline Infusion Sonography (SIS) to evaluate for:
      - Fibroids
      - Polyps
      - Adhesions
  - Fallopian Tubes
    - Hydrosalpinx – multiple cystic tubular structure in adnexa
    - Patency
      - SIS
      - HSG
      - Ultrasound
      - Rubin's Test
  - Ovaries
    - Follicles
      - Ideal 22mm
    - Polycystic Ovarian Syndrome (PCOS): follicles grow but do not develop normally preventing normal ovulation
      - Oligoovulation
      - Hypoandrogenism
      - Polycystic ovaries
        - Irregular bleeding
        - Thickened endometrium
  - Peritoneal Factors
    - 25%
    - Adhesions – fimbriae of fallopian tubes
    - Endometriosis
    - Laparoscopy

- Treatment Options
  - Monitoring Endometrium
    - Assessing the thickness and echogenicity pattern of the endometrium.
    - Ideal assessment is done transvaginally in a long/sagittal plane.
    - Calipers should be placed anterior to posterior (“Double-layer” thickness).
    - A normal echogenicity pattern is trilaminar.
    - A thin endometrium with abnormal echogenicity has been associated with decreased fertility.
  - Ovulation Induction Therapy
    - Ovarian stimulation in a controlled setting.
    - Baseline ULS
    - Administer Clomid (oral), Letrozole (oral), and human menopausal gonadotropins (injectables).
    - Enlargement of multiple dominant follicles.
    - ULS evaluates the number and size of the follicles (document all that are >1cm).
    - May need hCG to be given to trigger ovulation.
    - Correlate with serum estradiol levels.
  - Intrauterine Insemination
    - Treatment used to treat male factor or unexplained infertility.
    - Placing washed sperm into uterine fundus with a catheter.
    - Sperm may be from donor = Donor Insemination
    - ULS rarely used to guide this procedure
  - In Vitro Fertilization (IVF)
    - Fertilize oocyte outside the body then implanted into uterine cavity
    - The treatment plan for IVF consists of ovarian monitoring, needle aspiration of oocytes, incubation of oocytes, fertilization, and transferring the embryo(s) into the uterus.
    - Oocyte retrieval is accomplished by transvaginal ultrasound guidance.
    - Retrieval = endovaginal ULS
    - Embryo Transfer = transabdominal ULS
    - Ideal w/in 2cm of fundal apex
    - Catheter is checked under a stereomicroscope to ensure that all embryos have been transferred
- ART Risks
  - OHSS
    - Ovarian Hyperstimulation Syndrome
    - Enlarged ovaries (5 to 10 cm) with multiple cysts, abdominal ascites, and in severe cases pleural effusions, leg edema, hypotension, and polycythemia.
    - Younger patients who have undergone aggressive superovulation induction.
    - History of polycystic ovary syndrome
    - Graded based on patient symptoms.
  - Multiple Gestations
    - About 30% of in vitro fertilization pregnancies result in a multiple gestation.
    - Increased risk of fetal or neonatal morbidity and mortality.
    - Pregnancies that have 3+ fetuses are often counseled about fetal reduction options.
    - Fetal reduction is performed under ultrasound guidance by injecting potassium chloride into the fetal chest/heart.
  - Ectopic Pregnancies
    - Pregnancy that is implanted outside of the uterus.
    - Heterotopic pregnancy: an ectopic pregnancy coexisting with an intrauterine pregnancy.
    - With the advancement in ART, the estimated occurrence is 1:100 in ART patients.
    - Evaluate the adnexas.

- IVF Specific Risks
  - Maternal
    - OHSS
    - Multiple Gestations
    - Risks of Pregnancy
  - Fetal
    - Possible birth defects
- Multifetal Pregnancy Reduction
  - Reasons
    - Unsafe amount of embryos
    - Undesired amount of embryos
    - 3+ embryos
  - Process
    - Transabdominal ultrasound guidance
    - Needle is inserted from abdomen into uterus and into the selected fetus
    - Injects fetus with potassium chloride solution
    - Wait 2 minutes to reevaluate cardiac activity
    - Usually fetus is small enough to be reabsorbed by mother
  - Risks
    - Miscarriage of remaining fetuses
    - Preterm labor
    - Infection
    - Grief, guilt, depression
  - Benefits
    - Increases chance of healthy survival
    - Reduces maternal risk
    - Reduces risk for fetal disabilities