Reproductive Endocrinology and Infertility Rotation

Overview

This document describes the Obstetrics and Gynecology residency rotation in the subspecialty of Gynecologic Reproductive Endocrinology and Infertility (GREI) at McGill University. The residents participate in the routine clinics for 3 months during their PGY3 of residency.

Goal

The goal of this rotation is to achieve a minimum standard of competency related to knowledge, attitudes, and skills in Reproductive Endocrinology and Infertility (REI). The residents will experience surgery related to REI (Minimal Invasive Surgery=MIS) during one month of the rotation and assisted reproductive technology (ART) during the other two months. Although the core curriculum should be followed by all residents, the program could be tailored to the resident’s needs.

Orientation

The rotation in REI of 12 weeks total will take place at the McGill University teaching site:

- **McGill University Health Centre’s Royal Victoria Hospital (RVH)**

MUHC Reproductive Centre
- Clinics days start at 7:30 every day. They will join the fellow/staff to daily ultrasound follow-up of the patients under IVF treatments. They will practice the vaginal and abdominal scan.
- At 9:00 they will join one of the staff faculties of the clinic to experience the evaluation and follow-up of new patients and repeated visits.
- They will join OR days on F6 to see, understand and have basic skill of performing cyst aspiration and certain level of ovum pick-up, post-coital.
- Will participate and perform intra-uterine insemination (IUI), office hysteroscopy, endometrial biopsy, saline US, baseline US, vaginal cultures and PAP smears, breast exam.

Residents perform their duties and accept responsibilities under supervision. Throughout the program, the residents need to participate in the teaching program of the clinic. We encourage research to be an integral part of the residency and, during the training period, residents should take part in different stages of research and eventually publish their work in a peer-reviewed journal. The residents will be evaluated at the end of their rotation.
General Knowledge Goals
Following the completion of the program, the residents will demonstrate basic knowledge of:

- Embryology, anatomy, and histology of the male and female reproductive tracts and the anatomy, histology and physiology of the hypothalamo-pituitary-gonadal axis and related endocrine functions from fetal life to pregnancy and to post-menopausal years.
- Hormone action and endocrine pharmacology.
- Gametogenesis, gamete transport, fertilization, implantation, and early pregnancy development.
- Genetics, embryology, immunology, and microbiology of the reproductive process.
- Pathophysiology of the reproductive tracts and the related systems.
- Epidemiology of reproductive disorders.

General Skill Goals
Following the completion of the program, the residents will demonstrate the ability to:

- Manage patients with infertility, repeated pregnancy loss, ectopic pregnancy and other reproductive endocrine disorders.
- Conduct a variety of reproductive, advanced laparoscopic and hysteroscopic procedures, while considering indications, safety, complications, limitation of surgery and non-surgical alternatives.
- Understand the limitations and consult and collaborate with other physicians or health care experts including urologists, endocrinologists, general surgeons, oncologists, or geneticists.
- Participate in developing an experimental design and collaborate with other researchers.
- Establish and maintain an effective doctor-patient relationship and consult other physicians if necessary.
- Carry out ultrasound examination in the appropriate environment with respect to the patients’ privacy, cultural and religious needs. Select the equipment which is appropriate for the examination and to optimize its settings. Conduct the examination effectively in a gentle and considerate manner.
- Understand the normal morphologic ultrasound appearances of the female pelvis and its variations.
- Diagnose common gynecological abnormalities and to interpret ultrasound findings in the context of patient’s clinical history and symptoms.
- Follow and understand monitoring of women undergoing assisted reproduction treatments.
- Understand the limits of their competence and the need to seek advice where appropriate.
- Write a structured report about the patient.

The general knowledge and skill goals outlined above will be achieved through attaining specific objectives and CanMEDS competencies related to the following ten subjects in REI

1. General infertility, male and female evaluation  
2. Repeated pregnancy loss  
3. Abnormal uterine bleeding  
4. Ectopic pregnancy  
5. Research  
6. Fertility preservation  
7. Medical, reproductive and neuro-endocrinology  
8. Assisted reproductive technology  
9. Ultrasound  
10. Reproductive/endoscopic surgery
Specific Objectives and CanMEDS competencies

The role of medical expert is central to the function of the obstetrician-gynaecologist, and draws on the competencies for the roles of scholar, communicator, health advocate, manager, collaborator, and professional.

1. General infertility, male and female evaluation

Residents will manage a large number of infertility patients. Here, they will be responsible for investigations and management of both male and female partners under the supervision of the faculty. In general - the residents should have knowledge of human reproduction sufficient for an understanding of the pathophysiology of infertility. He/she should have sufficient knowledge to take a history and perform a physical examination relevant to infertility and to identify deviations from normal. He/She should demonstrate an ability to evaluate disorders and make a diagnosis. He/She should understand the indications for referral to other specialist.

Medical expert

Knowledge:
• Infertility in general, etiologies and management of infertile couples.
• Diagnostic testing of infertile patients, their indications, and contraindications, their limitations, sources of errors and interpretation.
• Different types of ovulation inducing agents, the mechanism of action of clomiphene citrate, FSH, and aromatase inhibitors, including the doses and regimens of usage and patient monitoring.
• Sperm preparation for artificial insemination and the different types of insemination.
• Indications for hysteroscopy, laparoscopy, in-vitro fertilization and other assisted reproductive technologies.
• Proper patient selection for medical and surgical management of infertility and for assisted reproductive technologies.
• Psychological, emotional, sexual, ethical, health economics, and social aspects of infertility.

Technical skills:
• Some competence in diagnostic laparoscopy, laparoscopic adhesiolysis, removal of endometriosis including endometrioma and laparoscopic microsurgical tubal anastomosis.
• Perform endometrial biopsy, transvaginal ultrasound, artificial insemination, and outpatient hysteroscopy under local anesthesia.

Communicator

• The resident must learn to establish a good rapport with the couple so that he/she will be able to obtain an adequate history and perform a general physical examination.
• Resident should record the information in a systematic fashion so that it will lead to a differential diagnosis and, with the appropriate interpretation of any additional information, to the development of a provisional diagnosis.
• The resident should be able to suggest a management plan.
• Understand the relationship between general medical disease and infertility.
• Recognize his/her own limitations within her field of competence and collaborate with other specialties and other health allied for the care of the patient.
• Understand the rationale of basic male and female infertility investigations.
• Apply appropriately clinical and laboratory methods of assessment of infertility.
• Organize fertility tests and treatment accordingly.
• Organize timing for testing and insemination.

Professional
• Arrive at the Reproductive Center at 7:30 a.m. for clinics. They will start the day with following the patients under treatment with ultrasound under the supervision of the residents or staff.
• See patients and the resident or the attending staff will review the case.

Scholar
• Review literatures for the weekly academic activities, ongoing clinical improvement, journal clubs, research, and publications.

2. Repeated Pregnancy Loss

During the training, residents will also manage women with repeated pregnancy loss. They will be responsible for investigation and management of the patients under the supervision of the faculty.

Medical expert

Knowledge:
• repeated pregnancy loss in general, etiologies, and management of these patients.
• diagnostic testing of these conditions, their indications, and contraindications, their limitations, sources of errors and interpretation.
• immunological theory of repeated pregnancy loss and the possible treatment.
• limitation of “Inadequate Luteal Phase” as a possible cause of early miscarriages and other endocrinological conditions including thyroid disorders.
• interpret hysterosalpingograms, ultrasound scans, and MRI images and detect abnormalities including uterine anomalies and intrauterine lesions.
• possible infectious causes of miscarriages and their treatment.
• thrombophilia as a possible cause of early miscarriages.
• indications and contraindications of hysteroscopy.
• emotional aspects of repeated miscarriages and know how to consult the patients.
• sexual, ethical, health economics and social aspects of repeated pregnancy loss.

Technical skills:
• perform diagnostic and operative hysteroscopy including resection of uterine septum, lysis of intrauterine adhesions and myomectomy.
• perform endometrial sampling and office hysteroscopy.
• advise appropriate surgical procedures to correct anatomical disorders including hysteroscopic metroplasty, myomectomy, lysis of adhesions, and abdominal myomectomy and participate in the surgery.
Communicator
- The resident must learn to establish a good rapport with the patient so that he/she will be able to obtain an adequate history including the evaluation of repeated pregnancy loss.
- Resident should record the information in a systematic fashion so that it will lead to a differential diagnosis and, with the appropriate interpretation of any additional information, to the development of a provisional diagnosis.

Manager
- The resident must develop a management plan including consulting a hematologist, geneticist, psychologist, psychiatrist or social worker if needed.
- Be sensitive to the religious background of the couples.
- Understand the relationship between disorder of reproductive system, endocrine and immunologic disorder, and repeated pregnancy loss.

Collaborator
- Residents must learn to establish a good rapport with the consulting hematologist, geneticist, psychologist, psychiatrist, or social worker.
- Recognize his/her own limitations and collaborate with other specialties and other allied health professionals for the care of the patient.

Professional
- Residents should initiate investigations and treatment for repeated pregnancy loss including consultation to different specialties.
- Demonstrate the ability to deliver the service with integrity, honesty, compassion, and ethics, and to exhibit appropriate personal and interpersonal professionalism.

3. Abnormal Uterine Bleeding

Infertile women often experience dysfunctional uterine bleeding. In our referral practice, we often encounter patients with abnormal uterine bleeding. Residents will be involved in the management of these patients.

Medical expert

Knowledge:
- Normal and abnormal menstrual cycles.
- Anatomy and histopathology of the pelvic organs and the endocrinology of the hypothalamo-pituitary-ovarian axis.
- Etiology and management of abnormal uterine bleeding.
- Various diagnostic tests, (including indications, contraindications, limitations, sources of errors and interpretation).
- Abnormal uterine bleeding in perimenarchal and perimenopausal states.
- Different types of hormonal and non-hormonal treatments, the regimes, and administration of the medications and patient monitoring.
• Detect malignancy.
• Diagnose hematological disorders.
• Interpret laboratory results, ultrasound images, and hysterosonograms.
• Correct the anemia with iron supplementation or indirectly with the use of gonadotropin releasing hormone analog (GnRHa).
• Proper patient selection for medical and surgical management of abnormal uterine bleeding.

**Technical skill:**
• perform endometrial sampling and office hysteroscopy.
• insert progesterone-containing IUD.
• prepare endometrium before operative hysteroscopy with GnRHa.
• Perform operative hysteroscopy including myomectomy and endometrial ablation.
• Perform abdominal myomectomy and hysterectomy.

**Communicator**
• Establish a good rapport with the patient so that he/she will be able to obtain an adequate history of abnormal uterine bleeding.
• Record the information in a systematic fashion so that it will lead to a differential diagnosis and, with the appropriate interpretation of any additional information, to the development of a provisional diagnosis.
• Explain to patients the implications, risks, and limitations of medical versus surgical treatment of abnormal uterine bleeding, including hysterectomy.
• Explain to patients myomectomy by laparoscopy or laparotomy.
• Explain to patients regarding uterine fibroid embolization.
• Be sensitive to the religious background of the patients such as Jehovah witnesses.

**Collaborator**
• Develop a management plan including imaging and consultation with other specialties including hematologist or endocrinologist.

**Professional:**
• Residents should provide investigations and treatment of abnormal uterine bleeding
• Consult hematologist, endocrinologist, or interventional radiologist if needed.
• Resident should follow the patients following treatment.
• Residents should be able to gather information for possible research or quality improvement for repeated pregnancy loss including consultation with different specialties.
• Demonstrate the ability to deliver the service with honesty, compassion and ethics, and to exhibit appropriate personal and interpersonal professionalism

4. Ectopic Pregnancy

Residents will encounter patients with ectopic pregnancy.

**Medical expert**
Knowledge:
- Advanced knowledge of gamete transport.
- Etiology and prevention of ectopic pregnancy.
- Predisposing factors for ectopic pregnancy.
- Be able to diagnose early ectopic pregnancy.
- Various diagnostic tests for this condition, their indications and contraindications, their limitations, sources of errors and interpretation.
- Advantages, disadvantages, and risks of medical and surgical treatment of ectopic pregnancy.
- Make proper patient selection for medical or surgical treatment.
- Side effects and dosage of methotrexate and be able to follow the patient after treatment.
- When to administer the second dose of methotrexate and to perform surgery if indicated.
- How to manage cervical pregnancy, abdominal pregnancy and cornual pregnancy.
- Implications of Rh incompatibility.
- Diagnose persistent ectopic pregnancy and to manage it.
- Indications and contraindications of medical versus conservative versus radical treatment.
- Emotional aspects of ectopic pregnancy and know how to consult for patients, who have a recurrent ectopic pregnancy.

Technical skill:
- Resuscitate and manage patients in shock.
- Perform transvaginal ultrasound.
- Diagnose ectopic pregnancy including heterotopic pregnancy.
- Perform laparoscopic treatment of ectopic pregnancy including salpingostomy or salpingectomy.
- Perform laparotomy if needed.

Communicator
- Establish a good rapport with the patient so that he/she will be able to obtain an adequate history of ectopic pregnancy.
- Record information in a systematic fashion so that it will lead to a differential diagnosis and, with the appropriate interpretation of any additional information, to the development of a provisional diagnosis.
- Residents must develop a management plan including diagnostic testing, medical or surgical treatment of ectopic pregnancy.
- Be able to advise patients about the implications and risks of different types of treatment.
- Be able to advise patients about possible tubal rupture.
- Be able to advise patients about Rh sensitization and future pregnancy.
- Be sensitive to the religious background of the patients such as Jehovah witnesses.

Professional
- Residents should provide investigations and treatment of ectopic pregnancy.
- Provide tests before medical treatment with methotrexate.
- Warn the patient about the possible tubal rupture.
- Give methotrexate injection and follow the patients following treatment.
- Preoperative preparation before surgery and organize surgery.
- Gather information for possible research or quality improvement.
• Demonstrate the ability to deliver the service with honesty, compassion and ethics, and to exhibit appropriate personal and interpersonal professionalism

5. Research

During their training, the resident will be encouraged to take part in a research project.

Medical expert
• Understand the scientific and medical background literature relevant to the research project.
• Formulate a research project, write a research protocol,
• Formulate the hypotheses and design a scientific project.
• In the clinical experiment, perform a power analysis.
• Understand the principles and limitations underlying different experimental methods, and be technically proficient in these methods.
• Perform a coherent set of experiments that may provide significant contribution to scientific or medical knowledge.
• Residents should record data thoroughly and in a systematic fashion.
• Understand the importance of careful and complete data gathering.
• Demonstrate the ability to interpret the results of the experiment.
• Understand basic principles of statistics and perform simple statistical calculation.

Collaborator
• In basic research, residents should be able to work as a team player with other researchers including technicians.

Communicator
• In clinical trial, residents should establish a good rapport with study participants ethically and without coercion and advise them about participation and non-participation in a study.

Manager
• Complete forms for Ethics Board
• Prepare participants for clinical trial or prepare animals or reagents for basic research.

Scholar
• Write an abstract for presentation.
• Use the data for presentation at national or international meeting.
• Take part in writing the manuscript for publication in a peer-reviewed journal.
• Write responses to journal queries.

Professional
• Demonstrate the ability to conduct research thoroughly with compassion and ethics.
• Present the results of their research at a national or international scientific meeting.
6. Fertility Preservation

Residents will provide consultation to young men and women undergoing cancer treatment under supervision of the faculty. They will also participate in the management of these patients.

Medical expert

Knowledge:
- Have knowledge of effects of different types of chemotherapy and radiation to the gonads.
- Obtain the knowledge of spermatogenesis and oogenesis and factors affecting this process.
- Be familiar with different methods of fertility preservation in men and women, their limitations, and possible complications.
- Be familiar with sperm, oocytes, embryo, and ovarian cryopreservation.
- Know the indications and contra-indications of the procedures.
- Be familiar with new advances of fertility preservation.
- Have an appreciation of psychological, emotional, and ethical aspects of fertility preservation.

Technical skill:
- Have knowledge when to perform ovarian suspension.
- Have knowledge when ovarian excision or oophorectomy for ovarian cryopreservation.
- Know how to perform oocyte retrieval for oocyte cryopreservation and which protocol to use.
- Have the knowledge of ovarian autograft.

7. Medical, Reproductive and Neuro-Endocrinology

During the rotation, resident will receive a detailed clinical introduction into pathologies of reproductive endocrine disorders. The trainee will interview and examine women with abnormalities of the menstrual cycle, hirsutism, and anovulation at two weekly reproductive endocrine clinics. Occasionally, residents might encounter male patients with hypogonadism.

Medical expert

Residents should acquire the following knowledge and technical skills:
1. Be able to understand normal steroid pathway and to interpret steroid pathway anomalies.
2. Know how to diagnose reproductive endocrine disorders including polycystic ovarian syndrome (PCOS), weight-related menstrual disorders and other menstrual dysfunction, prolactinoma, hypogonadotrophic hypogonadism, premature ovarian failure and hirsutism.
3. Be familiar with the diagnostic testing of the above disorders, their indications and contraindications, their limitations, sources of errors and interpretation.
4. For PCOS
   a. Be able to assess the metabolic risk factors including insulin resistance.
   b. Be able to induce ovulation using weight modification, insulin resistance modification, adrenal suppression, and clomiphene citrate and gonadotropin therapy.
   c. Have an understanding of the principles of ovulation induction with pulsatile GnRH therapy.
   d. Be able to treat androgen excess with anti-androgen therapies.
5. For hyperprolactinemia
a. Be able to examine patients with pituitary disease.
b. Be able to arrange endocrine tests and to interpret their results.
c. Be able to order and to interpret radiological images of the pituitary gland.
d. Be able to diagnose prolactinoma.
e. Be able to institute treatment and to monitor the results of therapy.
f. Have an understanding which patients require surgical treatment.

6. For hypogonadotropic-hypogonadism
   a. Know the differential diagnosis of the underlying pathology.
   b. Be able to administer hormonal replacement therapy, GnRH, or gonadotropin treatment.

7. For Premature Ovarian Failure (POF)
   a. Know how to define and to diagnose POF.
   b. Know the differential diagnosis of the underlying pathology.
   c. Be able to manage this condition.
   d. Know the related endocrinopathies.

8. For Menstrual Dysfunction
   a. Be able to investigate oligomenorrhea and amenorrhea.
   b. Be able to manage menstrual dysfunction.

9. For Hirsutism and Acne:
   a. Be able to conduct investigations of this condition.
   b. Be able to understand their relevance to PCOS and the associated risks.

Communicator

- The resident must learn to establish a good rapport with the patient so that he/she will be able to obtain an adequate history including the evaluation of endocrine disorders.
- Residents should record information in a systematic fashion so that it will lead to a differential diagnosis and, with the appropriate interpretation of any additional information, to the development of a provisional diagnosis.
- Resident must develop a management plan including hormonal evaluation and treatment.
- Be sensitive to the cultural and religious background of the couples.

Professional

- Residents should initiate investigations and organize hormonal tests including dynamic testing.
- Initiate treatment in consultation with a medical endocrinologist if needed.
- Demonstrate the ability to deliver the service with integrity, honesty, compassion, and ethics, and to exhibit appropriate personal and interpersonal professionalism.

8. Assisted Reproductive Technology

During this rotation, the residents will encounter a wide variety of assisted reproductive technologies (ART). They will manage the patients under the supervision of Tan, Buckett, and Sylvestre.

Medical expert

Knowledge:
- Oogenesis, spermatogenesis, and embryogenesis.
- Different techniques of assisted conception, their indications, and limitations.
- Different superovulation protocols and the use of GnRHa in assisted reproduction.
- Determine the protocol for “poor responders” and women with polycystic ovarian syndrome.
- Different types of sperm extraction and the indication of their use.
- Technique of ICSI (Intracytoplasmic Sperm Injection) and of the possible developmental implications in the babies born due to this technique.
- Factors influencing the results of ART.
- Understand the implications of gamete donation.
- Be familiar with the process of selection and counseling of potential oocyte and sperm donors.

**Technical skill:**
- Perform a simple sperm analysis, interpret the results and to recommend appropriate assisted conception techniques for different types of semen abnormalities.
- Ultrasound scanning of patients undergoing assisted conception with a special emphasis on the technique of accurate measurement of multiple follicles.
- Assist at and perform oocyte collection.
- Assist with and perform embryo transfers.

**Manager**
- Be able to decide the proper management including dosages of hormonal treatment.
- Be able to manage patients with azoospermia and severe asthenospermia.
- Be able to discuss the genetic testing required prior to assisted conception and to suggest appropriate treatments.

**Professional**
- Implications of transferring multiple embryos and the negative effects of multiple pregnancies on the pregnancy outcome and on the health system, understand the emotional and the financial impacts of multiple pregnancies, and understand the indications, contraindications, and implications of selective embryo reduction.
- They should obtain knowledge of hormonal manipulation of the recipients in the oocyte donation program, and they should be familiar with legal, ethical, and emotional aspects of oocyte and sperm donation.

9. **Ultrasound**

During their REI rotation, ObGyn residents will be performing transvaginal ultrasound on a variety of patients undergoing initial assessment and treatment of infertility. Resident will perform ultrasound with the assistance of ultrasound technicians and/or fellows under the direct supervision of the faculty.

**Medical Expert**

**Knowledge:**
- Physical principles of ultrasound and Doppler technologies, including advantages of colour Doppler measurements of uterine and ovarian arterial flow, and should be able to discuss their use in assisted conception.
• Advantages of transvaginal and transabdominal approaches and explain the advantages of different frequency probes used in ultrasound.
• Become familiar with the normal morphological characteristics of intrauterine pregnancy at the different stages of early gestation. Moreover, they should be able to recognize the signs associated with ectopic pregnancy.

Skills
• Ultrasound scanning of patients undergoing assisted conception treatment, with a special emphasis on the technique of accurate measurement of multiple follicles.
• Visualize the uterus and ovaries and how to measure uterine dimensions and ovarian volume.
• recognize and measure uterine fibroids and polyps, to determine the position of fibroids in relation to the uterine cavity,
• Recognize common anatomical uterine malformations by using ultrasound technology.
• Measure endometrial thickness and to describe and discuss the implications of different endometrial appearances.
• Perform and to interpret the results of hysterosonogram.
• Distinguish between different types of ovarian cysts and have a clear understanding of the appearance of endometriotic cysts and to determine their position in the pelvis.
• Recognize the ultrasonic appearance of hydrosalpinges.
• Determination of large small for gestational age including appropriate understanding of the limitations of biometry and detection of relevant ultrasonographic findings
• Diagnosis and follow-up of multiple gestation
• Determination of fetal viability
• Determination of ectopic pregnancy

10. Reproductive/Endoscopic Surgery

During one of the three months of the REI rotation, ObGyn residents will focus on endoscopic surgery. Depending upon their level of expertise, they may start with simple procedures such as diagnostic laparoscopies or they will perform more complicated procedures, such as excision of endometriosis.

Residents will assist at advanced endoscopic procedures including laparoscopic myomectomy, hysterectomy, tubal anastomosis and other operations that previously required a laparotomy under the direction of Drs. Tulandi/Buckett/Dr. Demirtas. They will also assist at office hysteroscopy and other advanced hysteroscopic procedures (hysteroscopic myomectomy, lysis of adhesions, endometrial ablation, and resection of uterine septum). If laparoscopy is not feasible or contraindicated, they will assist at laparotomy.

Medical expert

Knowledge:
• Indications, safety, complications, and limitation of endoscopic surgery as well non-surgical alternatives.
• Advanced gynecologic endoscopic operations, including the indications, safety, complications, and limitation of endoscopic surgery as well non-surgical alternatives.
Technical skill:
- Conduct a proper diagnostic laparoscopy, laparoscopic adhesiolysis, excision of endometriosis, endometrioma or other ovarian cyst and laparoscopic suturing.
- Perform tubal anastomosis.
- Perform diagnostic hysteroscopy, hysteroscopic myomectomy, lysis of adhesions, endometrial ablation, and resection of uterine septum.
- Perform at least 50 cases of operative laparoscopies and 25 cases of operative hysteroscopies.

Evaluation

MRESone45 - Evaluations will be done using the MRESone45 on-line system.

Log - ObGyn residents are expected to keep a log book of their activities during their rotation. This will be useful to ensuring adequate exposure to obtain the objectives of the rotation.

Resident Evaluation

The Residency Program Committee should identify those areas of the biomedical ethics curriculum to be evaluated and ensure that appropriate evaluation methods are included in the program in-training evaluation system.

The program should separately assess:
- the knowledge, attitudes, and skills the resident has in discussing and dealing with the ethical components of practice and clinical research, and
- the personal ethical behavior of the resident.

Program Evaluation

The biomedical ethics component of the program should be reviewed at least once a year by the Residency Program Committee and must be reviewed at the time of an internal review by the University Postgraduate Medical Education Committee and when a survey by the Royal College takes place.

References

Clinical Gynecologic Endocrinology and Infertility 8th ed, Fritz Speroff