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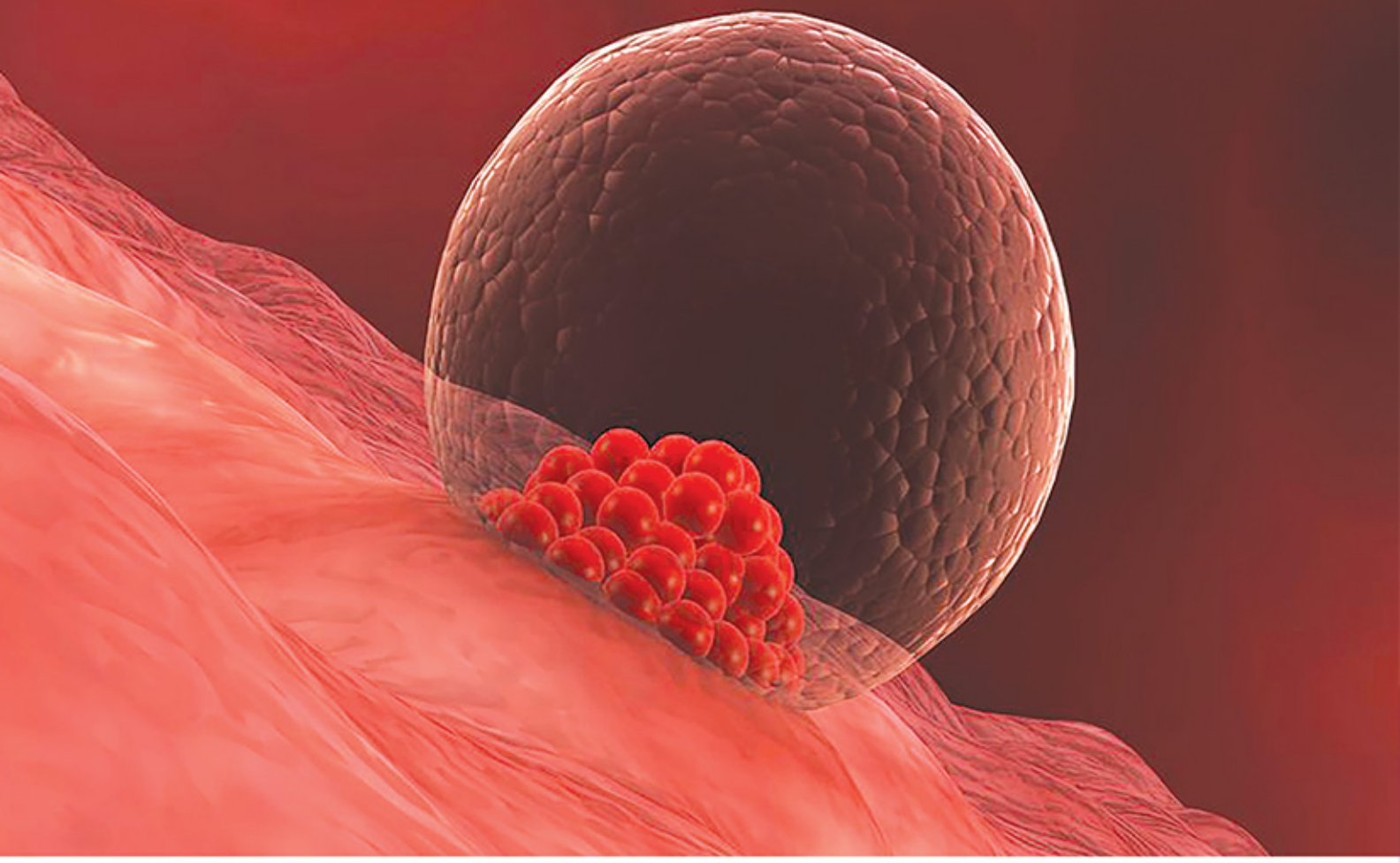
A Comprehensive Handbook of IVF



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CHAPTER 4

Counseling of Couple for In Vitro Fertilization

Suset Rodriguez, Jose Carugno

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INTRODUCTION

Infertility is a disease defined by the failure to achieve a successful pregnancy after 12 months or more of regular, unprotected intercourse or due to an impairment of a person's capacity to reproduce either as an individual or with her/his partner.[1] When there are no other pressing history or physical examination findings, women should be evaluated and treated after 12 months of unsuccessful attempts to spontaneously conceive if they are younger than 35 years old, at 6 months if they are 35 years old or older, and immediately if they are older than 40 years old.[1,2] It is estimated that 48 million couples and 186 million people suffer from infertility worldwide,[3-5] with about 15% of individuals affected in industrialized nations.[6] In vitro fertilization (IVF) is a treatment option for some couples with infertility which entails a sequence of procedures involving extracorporeal fertilization of gametes, including conventional in vitro insemination and intracytoplasmic sperm injection (ICSI).[2] Since the first baby born from IVF in 1978, this treatment option has had large success in helping families conceive children, with a success rate of approximately 50%.[7] This chapter will serve as a guide for counseling couples prior to starting their IVF treatment, including indications, contraindications, preconception evaluation, financial considerations, procedure aspects, complications and risks, and postprocedural expectations.

INDICATIONS

In vitro fertilization is recommended for patients suffering from certain types of infertility and in some patients without infertility. Within the realm of infertility, it can be used to treat patients with tubal factor infertility as the embryo is placed directly in the uterine cavity. Furthermore, it is used for diminished ovarian reserve, premature ovarian failure with the use of donor eggs, ovulatory dysfunction, same-sex couples with donor gametes, and unexplained infertility.[8,9] In addition, patients in whom pregnancy is contraindicated (see section "Contraindications") or with uterine factor infertility that cannot be surgically corrected can use IVF with a gestational carrier to have a genetically similar child.[10]

For patients without infertility, IVF can be used to select embryos without disease in those who are carriers of genetic conditions and for fertility preservation in cancer patients and those who choose to delay childbearing for any reason.[11]

CONTRAINDICATIONS

Contraindications to IVF are the same contraindications to pregnancy in general. The pregnancy-contraindicated cardiovascular conditions, as defined by the World Health Organization, based on maternal risk are pulmonary arterial hypertension, severe systemic ventricular dysfunction, severe symptomatic mitral or aortic stenosis, and several others.[12] In these cases, the use of a gestational carrier provides an alternative to conception with IVF.

PRECONCEPTION EVALUATION

Preconception evaluation is necessary to ensure that appropriate patient candidates are chosen for the procedure. Patients using autologous oocytes should be counseled that maternal age is a major factor in IVF success, with live birth rates per cycle declining from 42% in patients younger than 35 years to 1% for patients older than 44 years of age.[13] Women with advanced maternal age (age >35 years old) are also at risk for pregnancy complications for both mother and fetus,[14] and as such, some practices refer patients older than 40 years of age to maternal–fetal medicine for preconception counseling for the assessment and potential further workup of comorbidities.[15]

Furthermore, patients should be offered ovarian reserve testing for the purpose of detecting women who may have a

poor ovarian response to gonadotropin stimulation which then allows for modifications to optimize treatment and counseling regarding expected outcomes.[16] Testing can be accomplished with biochemical tests [cycle day 2–4 basal follicle-stimulating hormone (FSH) and estradiol and anti-Müllerian hormone (AMH)] and with transvaginal ultrasound to assess antral follicle count and ovarian volume during the follicular phase.[16] Additionally, the male patient should undergo semen analysis prior to fertility treatment.[17]

In addition, lifestyle factors are important to assess prior to starting IVF. Conclusive evidence has established the following modifiable risk factors to have worsened clinical pregnancy and live birth rates: Extremes of body weight, drugs, and tobacco use.[18] Obesity has been shown to significantly decrease the live birth rate in women undergoing IVF.[19] Furthermore, patients with morbid obesity have higher risks of sedation required for oocyte retrieval and have technically more challenging retrievals and transfers.[15]

Assessing uterine anatomy is of utmost importance for patients undergoing IVF. A thorough investigation of the uterine cavity is important to assess for any pathology, especially uterine fibroids and congenital uterine anomalies. Submucosal fibroids and intramural fibroids >4 cm have been shown to impact IVF outcomes[20] as well as the presence of uterine septum without resection.[21] Methods to assess the uterine cavity are transvaginal ultrasound, hysterosalpingogram (HSG), saline infusion sonogram (SIS), or hysteroscopy.[15]

Optimization of medical comorbidities is essential in the counseling of IVF patients. Thyroid disease has been shown to impact fertilization, pregnancy rate, and live birth rate.[22,23] Uncontrolled diabetes and hypertension inherently bring high risks to any pregnancy, and poor control can have adverse effects on the mother and fetus.[24-26] Additional counseling is recommended in patients with mood disorders, human immunodeficiency virus (HIV), thrombophilias, prior bariatric surgery, and prior pregnancy complications as they have implications for future pregnancies.[27] Similarly, current medications should be reviewed to ensure that teratogenic medications are discontinued, and women should be taking prenatal vitamins with folic acid.[15,27] Screening for androgen use in males is also recommended due to its correlation with infertility.[28]

Providing genetic carrier screening to couples undergoing IVF plays a crucial role. Carrier screening is genetic testing conducted on an individual who does not have an apparent phenotype for a genetic disease but may have a variant allele within a gene(s) associated with a diagnosis.[29] The American College of Obstetrics and Gynecology (ACOG) recommends offering carrier screening to all women considering pregnancy for spinal muscular atrophy and cystic fibrosis, with additional screening based on specific familial risk factors, such as screening for Tay–Sachs disease in patients of Ashkenazi Jewish descent.[29] A complete blood count (CBC) is also recommended for risk assessment of hemoglobinopathy with possible hemoglobin electrophoresis.[29] If any abnormal results are detected in the woman, the partner is then tested. Knowledge of genetic disease carrier status allows for an informed discussion with the couple regarding the option of performing preimplantation genetic testing to select an embryo without the disease for transfer.[27]

Finally, screening for infectious diseases is a vital part of preconception evaluation. HIV, hepatitis B, and hepatitis C can be transmitted from affected mothers to the fetus or newborn and also through assisted reproductive technologies; therefore, screening for these diseases is imperative. Screening for gonorrhea, chlamydia, and syphilis is also recommended based on age and risk factors.[30]

Financial Aspects

The average cost of one IVF cycle in the United States is $12,400;[31] however, it can range widely depending on third-party insurance coverage.[32] Studies have demonstrated the average cost per IVF cycle to be approximately $20,000–$25,000 with the cost of live birth >$60,000.[33,34] Currently, 20 states have required insurance companies to cover or offer coverage for diagnosis and treatment of infertility, with 13 states mandating third-party coverage for IVF.[35,36]

Procedure

The process of IVF begins with ovarian stimulation to produce follicles. The pituitary is desensitized or blocked with gonadotropin-releasing hormone (GnRH) receptor agonists or antagonists, followed by large doses of gonadotropins, FSH, and luteinizing hormone (LH), which stimulate the growth of ovarian follicles that contain oocytes. Many protocols exist with different combinations of the above components. Throughout this process, there is frequent laboratory and transvaginal ultrasound monitoring to assess the growth of the follicles and hormone response. Once follicle size and hormone laboratory levels are adequate, medication is administered for oocyte maturation, and the patient then undergoes transvaginal ultrasound-guided oocyte retrieval under sedation. The retrieved oocytes are then frozen or fertilized with sperm to create embryos, with subsequent freezing or transfer of embryo(s). The patient is then monitored to assess for implantation and pregnancy.

Possible Complications and Risks

The risks of undergoing IVF are rare. There is a <1% risk of bleeding, infection, and damage to the surrounding

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structures.[37] Another risk is that of ovarian hyperstimulation syndrome (OHSS), which is an amplified response to ovarian stimulation resulting in abdominal distension, ovarian enlargement and respiratory, hemodynamic and metabolic complications.[2] The risk of OHSS is 1–5% and can be diminished with prior assessment of ovarian reserve to adjust stimulation medications and with the use of frequent laboratory and ultrasound monitoring.[2,38-40] An additional uncommon risk of IVF is that of ovarian torsion, with a risk of <1%.[41]

Pregnancies conceived from IVF compared to spontaneous conception are at a higher risk of preeclampsia, gestational hypertension, placental abruption, placenta previa, antepartum hemorrhage, risk of cesarean delivery, congenital anomalies, preterm rupture of membranes, low birth weight, perinatal mortality, preterm delivery, and small for gestational age.[42,43]

POSTPROCEDURAL EXPECTATIONS

Patients should be counseled regarding what to expect after completing an IVF cycle. Bedrest has not been shown to improve implantation rates nor changes in diet.[44] Mild common adverse effects include mild cramping and bloating, small amount of clear or bloody vaginal discharge, breast tenderness, and constipation.[15,17] If the patient experiences moderate or severe pain, heavy vaginal bleeding, or fever, they should be counseled to present to the hospital for further evaluation.[17]

CONCLUSION

Patients undergoing IVF must be subjected to thorough evaluation and counseling prior to starting IVF to enhance pregnancy outcomes. Furthermore, optimization of medical comorbidities is crucial to improving IVF outcomes and decreasing pregnancy risks. Discussion of the IVF process with risks and postprocedural expectations is a key component of the counseling process.

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A Comprehensive Handbook of IVF

A Comprehensive Handbook of IVF is a meticulously planned book that gives an updated, practical review of clinical as well as embryological aspects of IVF. Each section is designed to include in-depth information encompassing the basics as well as advanced procedures; be it the stimulation protocols, selection of machines and equipments, culture media, troubleshooting or patient counseling. Every reader will find some take-home tips related to transvaginal sonography, hysteroscopy, oocyte pick up, embryo-transfer, etc. We have also devoted a chapter on the much ignored but very sensitive issue of mental & physical well-being of Embryologists. We, as Editors, believe that our holistic approach towards creating this handbook can serve as a ready reckoner for all, be it students, beginners or IVF specialists.



Sushma Deshmukh MD DGO is the Director of Central India Test Tube Baby Centre. She is the Head of the Department of Obstetrics and Gynecology at Get Well Multispecialty Hospital and Research Centre, and In-charge of Deshmukh Hospital, Nagpur, Maharashtra, India. She is the President of Obstetrics & Gynecological Society of Nagpur in 2023–24. Chapter Secretary of Indian Fertility Society Vidarbha Chapter 2021–24. Her main interests are in infertility, hysteroscopy and high-risk pregnancy. She has organized three national and one international conference on Hysteroscopy in 2014, 2016 and 2018. One national conference on Infertility in 2023. Medico-spiritual conference with Brahmakumaris in 2023. She has written more than 25 books which include academic, non-academic and story books. Following are the academic books—Infertility Management Made Easy (2007, 2nd edition 2013, 3rd edition 2021), Mini-Atlas in Infertility (2008), Tubal Function Tests (2010), Mastering Techniques in Hysteroscopy (2016, 2nd edition 2022), Key-Notes in Hysteroscopy (2018), Updates in Hysteroscopy–2023, Clinical Key Notes in Obstetrics–2023. She is peer reviewer of International Journal of Gynecology and Obstetrics. She has written public awareness books for adolescent girls, infertile couples, reproductive age group, perimenopausal age group, sonography book, three story books, one drama book, one internet book in Marathi, Hindi and English (total 18), Poem book, Bal-bol. Three public awareness dramas are on stage. She conducts lots of public awareness programs. She runs the Garbha-Sanskar Group, a PCOS club of Central India. She is a regular writer for a newspaper. Her main interest is to update the knowledge, share and give benefits to all patients.



Bindu Chimote MSc PhD (Biochemistry) MSc Clinical Embryology (Leeds, UK) is a Senior Consultant Clinical Embryologist with rich knowledge and vast experience of over 18 years in the field of Embryology. She is associated with several IVF centres across Nagpur and Vidarbha. She is the Joint-Secretary of Indian Fertility Society Vidarbha Chapter (IFS-VC 2021-2024). She is academically highly motivated, with 18 original research paper presentations as first author and 46 as co-author at the prestigious international conferences European Society of Human Reproduction and Embryology (ESHRE), American Society for Reproductive Medicine (ASRM) and International Federation of Fertility Societies (IFFS) World Congress. She has 10 original research publications in international peer-reviewed journals and has contributed 16 chapters in international books on Infertility. She is a reviewer for the international journals Reproductive Biology and Endocrinology (RBE) and Journal of Assisted Reproduction and Genetics (JARG). Her special interests include research in reproductive endocrinology and OMICS research, especially follicular fluid metabolomics, proteomics and secretomics. She has several awards to her credit including Best Research paper award twice at ASRM, Excellence in Embryology award instituted by the Indian Fertility Society (IFS) and Indian Society of Assisted Reproduction (ISAR) and Women Torch Bearer Award on the occasion of International Women's Day. She has also done a masters in English Literature and is a popular Anchor for several literary and cultural events.

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