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Manual of

Mysteries of Infertility Unravelled

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CHAPTER 3

New Trends to Maximize Intrauterine Insemination Success Rates

Teena Gupta

DEFINITION

A procedure to treat infertility in which processed semen is introduced into the uterine cavity with the rationale of increasing the density of energy-laden gametes at the time and the site of fertilization.

INDICATIONS

- Mild male infertility
- Unexplained infertility
- Ovulatory dysfunction, polycystic ovarian syndrome (PCOS)
- Mild endometriosis grade 1 and 2
- Cervical factors
- Coital issues
- Immunological factors
- Infections such as HIV, HBsAg
- Donor sperm insemination
- Frozen samples when husband is not available or on antineoplastic treatment.

STEPS OF IUI

- Evaluation and patient selection
- Ovarian stimulation
- Ovulation monitoring
- Semen preparation
- Insemination
- Luteal support

SELECTION CRITERIA FOR GOOD SUCCESS RATES IN INTRAUTERINE INSEMINATION (IUI)

- Age of female < 35 years
- Duration of infertility < 5 years
- Good ovarian reserve based on serum anti-Müllerian hormone (AMH) and day 2 antral follicular count (AFC)
- Mild male factor infertility with total motile sperm count (TMSC) greater than 5 million per mL and normal sperms more than 4% (Equation

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for calculation of TMSC = Sperm count in million per mL × Volume of ejaculate in mL × Percentage motility/100)

- Minimum one functional normal fallopian tube and no uterine factor

TIPS TO MAXIMIZE SUCCESS RATES

- Follow strict selection criteria of patients.
- Aim for two to three dominant follicles at maximum.
- In unexplained infertility following are the success rates:
  1. Natural cycle: 8%
  2. Clomiphene citrate (CC): 8–9%
  3. Letrozole: 12–14%
  4. Letrozole or CC plus gonadotropins: 20–22%
  5. Gonadotropins: 25%
- For gonadotrophin stimulation start with small dose 37.5–75 IU, step up by 37.5 IU, and take care response may be sudden and explosive once the threshold is crossed. According to Cochrane database systematic review, 2015 September, there is no difference in live birth rates between various gonadotropin preparations human menopausal gonadotrophin (hMG) versus follicle-stimulating hormone (FSH) and also among various types of preparations like urinary versus highly purified (HP) versus recombinant. Chronic low dose protocol is very effective in PCOS patients to decrease the incidence of multiple pregnancies and ovarian hyperstimulation syndrome (OHSS). In this protocol stimulation is started with 37.5–75 IU and is continued till 10–14 days before increasing the dose.
- Follicular monitoring with good ultrasound 2D, 3D and color Doppler improves the results.[1]
- Optimal pre-hCG (human chorionic gonadotropin) follicular parameters:
  1. Follicular diameter of minimum 16–17 mm and volume 3–7 cc
  2. Vascularity covering at least three-fourths of the follicular circumference
  3. Perifollicular resistance index (RI) 0.42–0.48
  4. Perifollicular PSV > 10 cm/s
  5. Follicular VI > 6, FI > 35
  6. Presence of cumulus oophorus
- Optimal pre-hCG endometrial parameters:
  1. Endometrial thickness minimum 6 mm, preferably 8 mm
  2. Grade A or B endometrium
  3. Vascularity in zone 3 or 4 covering more than 5 mm^2
  4. Endometrial RI 0.49–0.59 ,PI 1.1–2.3
  5. Uterine artery PI < 3.2
  6. Endometrial volume > 3 cc
  7. Endometrial FI > 40, VFI > 20
- Abstinence interval of less than 3 days gives maximum pregnancy rate 14% and interval of more than 10 days pregnancy rate lower 3%.

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- *Timing of IUI:* IUI gives best results when performed just before ovulation or within 10 hours of ovulation, so
  1. If serum LH > 10–12 mIU/mL or urine LH kit test positive do IUI 24 hours after LH surge, or
  2. If no LH surge does IUI 34–46 hours (average 38 hours) after ovulation trigger, or
  3. Double insemination at 12 and 36 hours in mild male factor infertility and donors' semen.
- No difference in outcome between semen preparation techniques swim-up or gradient techniques.
- Processed semen volume of 0.3–0.7 mL
- Insemination of sample 1–2 cm above the internal os
- Inseminate slowly over 3–5 minutes
- Wait for few seconds to prevent reflux
- Patient should lay supine for 10 minutes, no need of head low, restriction of routine activities, antibiotics and analgesics.
- Pregnancy rates in ultrasound-guided and blind insemination are similar.
- In difficult internal os negotiation, identify acute anteversion (then full the bladder) and acute retroversion (then empty the bladder) hold the cervix with Allies or tenaculum and give traction, in known cases do cervical dilatation on day 2 or 3 of menses.
- In cases of premature LH surge addition of GnRH antagonist along with gonadotropins may increase the pregnancy rates.
- *Role of adjuvants:* Insulin sensitizer drugs such as metformin or inositol may benefit in obese anovulatory PCOS. Other drugs with questionable efficacy are dexamethasone, estrogen, ecosprin, L-arginine, sildenafil, etc.
- *Luteal phase support*: Progesterone (oral or vaginal) increases the live birth rate in especially gonadotropins cycles.[2]

CONCLUSION

Evidence of financial, economics, and clinical considerations strongly favors IUI as a first-line treatment option for subfertility. IUI is a preferred method for ovulatory dysfunctions, unexplained infertility and mild male infertility. Superovulation along with a IUI increases the success rates.

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