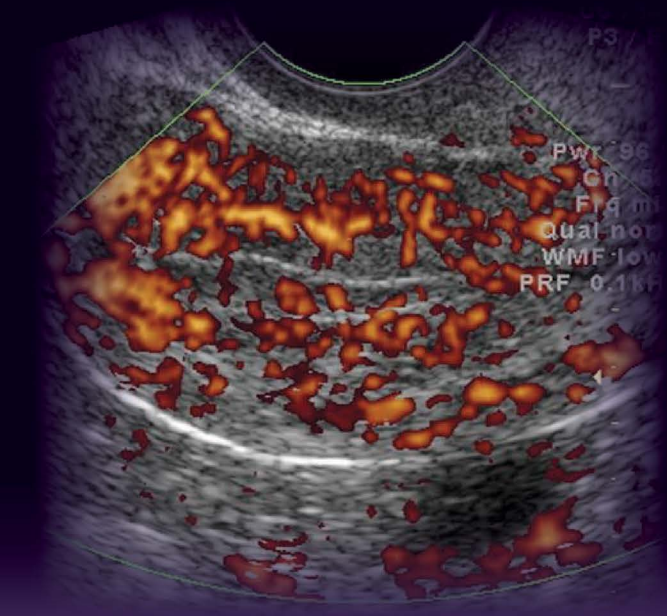

Step by Step®

Step by Step® Ultrasound in Infertility

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2nd Edition

JAYPEE

Contents

CHAPTER

4

Male Infertility: Causes and Investigations

Male factor accounts to about 40–50% of infertility.

DEFINITION

Failure to conceive within one or more years of regular unprotected coitus during fertile period is infertility.

- **Primary**: Never conceived.
- **Secondary**: Achieved pregnancy once but thereafter cannot conceive within one or more years of regular unprotected intercourse during fertile period.

MALE ANATOMY AND FUNCTIONS

- **Testis:**
  i. Seminiferous tubules—Spermatogenesis
  ii. Cells of Leydig—Testosterone production
- **Seminal vesicles—Produces viscous, alkaline fluid rich in fructose**
- **Prostate—Produces prostaglandin**
- **Ductal system**
  i. Epididymis—Maturation of sperm and transport
  ii. Vas deferens—Sperm storage and acidification (decrease motility)

iii. Ejaculatory duct—Convergence of vas and seminal vesicles (to urethra)
iv. Urethra—Terminal portion of the seminal fluid passage (ejaculation).

CAUSES OF MALE INFERTILITY

Anatomical Factors

- Cryptorchidism
- Hypospadias
- Epispadias
- Varicocele
- Congenital absence of vas.

Genetic Factors

- 47, XXY
- 46, XY-mosaic
- Azoospermic.

Endocrine Factors

- Thyroid dysfunction
- Cushing disease
- Acromegaly
- Pituitary tumor.

Infective Factors

- Tuberculosis
- Gonorrhea
- Chlamydia.

Ejaculatory Factors

- Anejaculation
- Retrograde ejaculation
- Premature ejaculation.

Other Factors

- Environmental toxins
- Medication
- Trauma
- Psychological
- High viscosity
- Sperm antibodies
- Low fructose content
- Immotile sperm.

Idiopathic (Fig. 4.1)

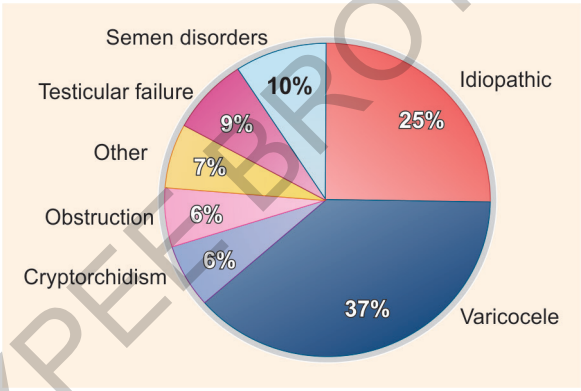

Fig. 4.1: Causes of male infertility.

DRUGS CAUSING IMPOTENCY AND EJACULATORY DYSFUNCTION

Sedative and Antidepressant

- Amitriptyline
- Chlordiazepoxide

- Diazepam
- Imipramine
- Monoamine oxidase inhibitors
- Perphenazine.

Phenelzine Sulfate

- Thioridazine
- Trifluperazine hydrochloride.

Antihypertensive

- Clonidine
- Gunethidine sulfate
- Hydralazine
- Methyl dopa
- Metoprolol
- Phenoxybenzamine hydrochloride
- Prazocin hydrochloride
- Propranolol
- Reserpine
- Spironolactone
- Thiazide diuretics.

Drugs of Abuse

- Alcohol
- Codein
- Cocaine
- Heroin
- Nicotine
- Methadone
- Meperidine.

Others

- Clofibrate
- Cimetidine
- Digoxine
- Ketoconazole.

Effects in Men	
Narcotics, barbiturates	Cause impotence, affect sperm production
Prescription medications	Cause impotence, affect sperm production
Chemotherapy	Testicular failure
Calcium channel blockers	Inhibit sperm production
Radiation	Testicular damage or cancer
	Chromosomal aberrations
Frequent exposure to heat	Temporarily reduce sperm production

Smoking affects	*Alcohol use causes*
• Motility	• Lower testosterone levels
• Morphology	• Decreased sperm production
• Fertilization capacity	• Impotence
• Sperm production	

MALE INFERTILITY WORK-UP

i. Medical history
ii. Physical examination
iii. Laboratory evaluation
iv. Scrotal/rectal ultrasound

MEDICAL HISTORY

Ask for:

- Sexually transmitted diseases
- Exposure to toxins
- Substance use (tobacco, alcohol, other drugs)
- Medications
- Surgery
- Radiation
- Physical exertion/heat.

PHYSICAL EXAMINATION

Examine Penis

- Hypospadias
- Surgical or traumatic scars
- Induration, plaques
- Phimosis
- External urethral meatus
- Ulceration or urethral discharge
- Size.

Examine Testes

Testicular examination	*Normal findings*
Site	Palpable, low in scrotum
Position and axis	Vertical orientation with epididymis lying behind or median
Volume	Related to ethnic group; mostly depends on stature
Consistency	Rubbery

Examine Epididymis

Normal Epididymis

- Barely palpable
- Regular outline
- Soft consistency.

Look for

- *Painful nodules*:
  - Epididymitis
  - Sperm granulomata
- Caput epididymitis

Examine Prostate Gland

- Rectal examination
- Identify central groove
- Normal prostate:
  - Soft
  - Regular
  - Not painful.

Inguinal Examination

- Inguinal scars
- Presence of pathological enlargement of inguinal lymph nodes.

LABORATORY EVALUATION

- Sperm/semen analysis
- Sperm agglutination
- STD screening
- Prostatic fluid expression

- Post-orgasm urine
- Hormone determinations
- Additional tests.

SEMEN ANALYSIS

It is the most important and first requisite for evaluation of male infertility factor.

Semen Collection

- Exclusive neat and clean place (room) with washing facilities
- Collection after 4 days of abstinence (< 2 days – oligozoospermia and > 7 days – asthenozoospermia)
- Collection by masturbation after cleaning hands and penis by soap/water and drying with sterile towel
- Collection must be done in a wide mouth, clean, dry (wet – kills sperms or causes tail defects) and nontoxic container (preferably sterile container for culture or sperm preparation)
- Semen sample—a potential biohazard (bacterial/viral) for HCV, so handle with care and proper disposal after examination.
- **Color:** Gray
- **Appearance:** Opalescent
- **Odor:** Musty
- **Liquefaction:** < 30 min (coagulation – proteins from seminal vesicles and liquefaction because of prostatic secretions)
- **Volume:** Seminal vesicles—70%, prostate—20%, testes—5% and bulbourethral gland—5%.

DEFINITIONS: SEMEN ANALYSIS

Normozoospermia	Normal ejaculate
Oligozoospermia	Sperm concentration < 10 million/mL
Asthenozoospermia	Movement abnormalities
Teratozoospermia	< 30% sperm with normal morphology
Oligoasthenoteratozoo-spermia	Disturbance of all three variables
Azoospermia	No sperm in ejaculate
Aspermia	No ejaculate

- Neubauer counting chamber—widely available and economical (requires dilution of semen, so chances of error)
- Makler or Horwell counting chamber—expensive (dilution of semen sample not required) (Fig. 4.2).
- Number of indigenously manufactured counting chambers are now available (sperm cell, cryo cell) (Figs. 4.3A and B).
- CASA – computer assisted semen analysis (eliminates subjective errors).

SEMEN ABNORMALITIES

- *Common cause of abnormalities:* Artefact (incorrect collection/examination methodology)
- *Reddish color:* Hemospermia—trauma, inflammation or tumor of the genital tract
- *Highly viscous semen:* Cause is not known (impaired motility)
- *Liquefaction:* Failure (impaired motility)—impaired prostate function
- *Semen volume:* Hyperspermia—> 10 mL may cause dilutional oligozoospermia

Fig. 4.2: Makler's sperm counting chamber.

Fig. 4.3A

Figs. 4.3A and B: Indian cryo cell sperm counting chamber.

- *Aspermia:* Absence of sperms in the ejaculate:
  1. Retrograde ejaculation—in bladder
  2. Anejaculation—problem with ejaculation
  3. Bilateral ejaculatory duct obstruction
- *Sperm concentration:* If < 10 million/mL—oligozoospermia (repeat semen analysis after 3 months: 74 days for process of spermatogenesis and 12–20 days for travel)
- *Azoospermia:* No spermatozoa in the fresh or centrifuged resuspended semen sample
- *Polyzoospermia:* If > 350 million/mL
- *Sperm motility:* If < 50% progressively motile—asthenozoospermia (EM-sperm tail defect)
- *Necrozoospermia:* Dead sperms
- *Teratozoospermia:* Presence of > 70% abnormal sperm morphology in the sample.

SPERM AGGLUTINATION ASSAY

- Detects anti-sperm antibodies
- Intrauterine insemination or indirect MAR
- Immunobead most appropriate for screening

Positive if >10% of motile sperms are coated with antibodies.

STD SCREENING

- Test for past chlamydia infection
- Immunoglobulin G (IgG/IgM).

PROSTATIC FLUID DETERMINATION

- Obtained during rectal exam
- Examined wet in phase-contrast or clear-field illumination
  - Normal < 5 WBCs/HPF
  - Abnormal > 10 WBCs/HPF
- If not obtained, use first 10 mL of urine
  - Abnormal > 5 WBCs/HPF.

POST-ORGASM URINE

- Determine retrograde ejaculation
- Urine voided after ejaculation

Cloudy urine indicates retrograde ejaculation.

HORMONE DETERMINANTS

Serum FSH	• Hypergonadotropic and normo- or hypogonadotropic hypogonadism
Plasma testosterone concentration	• Hypoandrogenism
Serum LH	• Hypogonadotropic hypogonadism
Prolactin	• Hypoandrogenism or sexual dysfunction

Step by Step®

Ultrasound in Infertility

Salient Features

- After the overwhelming response to the first edition, the authors have teamed again to compile a Step by Step ultrasound book in infertility
- This book has simplified the approach to infertility by introducing a lot of flowcharts, tables and clear images to understand the normal and abnormal in male and female infertility.

Narendra Malhotra is a great academician and medical teacher of this field and has given many practical tips for these procedures. He is currently President of INSARG. He is Past President of FOGSI, ISAR, ISPAT, IFUMB; Vice President of WAPM & SAFOG and a stalwart in the field of infertility has been teaching the subject for years.

Nidhi Gupta is a Professor of Obstetrics and Gynecology at SN Medical College, Agra with a vast experience in the field of Obstetrics and Gynecology. She is an excellent teacher and academician with a passion for teaching.

Neharika Malhotra is a young dynamic obstetrician and gynecologist from Agra. She is a bright upcoming star in the field of infertility with new ideas and methodology of teaching. Chair YTP committee FOGSI.

Jaideep Malhotra is a great academician and medical teacher of this field and has given many practical tips for these procedures. She is Past President of FOGSI, ASPIRE, ISAR, IMS; President of SAFOM & ISPAT and a stalwart in the field of infertility has been teaching the subject for years.

Kuldeep Singh is an experienced sonologist of India.

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