Patient information: Treatment of male infertility (Beyond the Basics)

Authors
Christina Wang, MD
Ronald S Swerdloff, MD

Section Editor
Peter J Snyder, MD

Deputy Editor
Kathryn A Martin, MD

Disclosures

All topics are updated as new evidence becomes available and our peer review process is complete.
Literature review current through: Jul 2012. | **This topic last updated:** Jun 5, 2012.

MALE INFERTILITY OVERVIEW — Infertility is defined as a couple's inability to become pregnant after one year of unprotected intercourse. In any given year, about 15 percent of couples in North America and Europe who are trying to conceive are infertile.

The fertility of a couple depends upon several factors in both the male and female partner. Among all cases of infertility in developed countries, about 8 percent can be traced to male factors, 37 percent can be traced to female factors, 35 percent can be traced to factors in both the male and female partners, and 5 percent cannot be traced to obvious factors in either partner [1].

When infertility occurs, the male and female partners are evaluated to determine the cause and best treatment options. In the past, men with infertility had few options because there was limited information about causes and even less information about successful treatment. However, new tests have made it possible to determine the causes of male infertility and treatments, and assisted reproductive techniques (ART) offer hope to many couples.

Separate articles discuss the treatment of female infertility (see "Patient information: Ovulation induction with clomiphene (Beyond the Basics)" and "Patient information: Infertility treatment with gonadotropins (Beyond the Basics)" and "Patient information: In vitro fertilization (IVF) (Beyond the Basics)").

MALE INFERTILITY CAUSES — Fertility in men requires normal functioning of the hypothalamus and pituitary gland (hormone-producing glands in the brain), and the testes (figure 1). Therefore, a variety of conditions can lead to infertility.

- 30 to 40 percent of cases are due to problems in the testes (of which about 15 to 25 percent are due to genetic causes)
- 10 to 20 percent are due to a blockage in the pathway that sperm use to exit the testes during ejaculation; this can be caused by prior infection (figure 2)
- 1 to 2 percent of cases are due to conditions of the pituitary gland or hypothalamus
- 40 to 50 percent of cases have no identifiable cause, even after an evaluation

MALE INFERTILITY EVALUATION — A separate article discusses the evaluation of infertility in men. The most important test for infertile men is a semen analysis (sperm evaluation). A normal result tells you that the male partner most likely does not have an infertility problem. (See "Patient information: Evaluation of the infertile couple (Beyond the Basics)".)

MALE INFERTILITY TREATMENT — The treatment of male infertility depends upon the underlying cause. Several months to years of treatment are usually necessary to achieve fertility. The treatment often involves both male and female partners.

Blockage of the reproductive tract — Men who have a blockage in the ducts conveying the sperm from the testis until ejaculation (so that sperm cannot get out) can undergo surgery to correct the blockage. If it is not successful, another option is assisted reproductive technologies using sperm retrieved from the testes. (See "Treatment of male infertility", section on 'Retrieval of sperm from the testis'.)

Vasectomy (male sterilization) is a different type of blockage. Vasectomies can be reversed in up to 85 percent of cases; over 50 percent of couples can achieve pregnancy following vasectomy reversal. However, the more time that has passed since the vasectomy, the less likely vasectomy reversal is to restore fertility.

Treatment of hypothalamic or pituitary deficiency — In a small percentage of cases (1 to 2 percent), male infertility is due to problems in the hypothalamus and pituitary gland (parts of the brain that regulate hormone production). In this case, treatment with human chorionic gonadotropin (hCG), recombinant human follicle stimulating hormone (rhFSH), also called gonadotropin treatment, is often given.

Gonadotropin treatment — Gonadotropin treatment is started with injections of hCG three times per week (or sometimes every other day) for up to six months. Blood tests are used to monitor blood testosterone levels and to adjust the dose if necessary. If sperm cells do not appear in semen after six months of treatment, recombinant human follicle stimulating hormone (rhFSH) is added; this is also given by injection. The success rate for this therapy is high as most men will eventually develop sperm in the ejaculate. In many cases, a total of one to two years of treatment is needed to achieve normal fertility. The cost of these treatments can be significant, especially if health insurance does not cover the costs of infertility treatments.

Varicocele — A varicocele is a dilation of a vein (like a varicose vein) in the scrotum. Many men with varicocele have a low sperm count or abnormal sperm morphology (shape). The reason a varicocele affects the sperm may be related to a higher-than-normal temperature in the testicles, poor oxygen supply, and poor blood flow in the testes.

Varicocele can be treated surgically by cutting the veins connected to the varicocele. However, surgery does not always improve fertility and is not recommended for most men unless there is a large varicocele. A varicocele that has been present for a long time can cause irreversible damage that cannot be surgically treated.

An alternative to varicocele repair is assisted reproductive techniques (ART), such as intracytoplasmic sperm injection (ICSI). With ICSI, only a small number of sperm are needed (see 'Intracytoplasmic sperm injection (ICSI)' below).

Other — Treatment is not currently available for most types of male infertility. For example, there is no known treatment when the sperm-producing structures of the testes have been severely damaged or are abnormal. This happens in men with certain chromosomal abnormalities such as Klinefelter syndrome and small deletions in the Y (male specific) chromosome (see 'When infertility cannot be treated' below).

ASSISTED REPRODUCTIVE TECHNIQUES — If the male partner's semen contains few sperm, no sperm, abnormal sperm, or sperm with poor motility, assisted reproductive techniques can often help. These techniques offer hope to some infertile couples who could not achieve pregnancy without them.

However, the techniques are expensive, require a considerable commitment of time and energy, may pose certain health risks, and may have disappointingly low success rates. Couples should discuss the pros, cons, and success rates of these techniques with an infertility specialist.

In vitro fertilization (IVF) — IVF is a commonly used technique for a variety of infertility problems, including female tubal blockages and unexplained infertility. IVF is usually recommended with ICSI for men with infertility. (See 'Intracytoplasmic sperm injection (ICSI)' below.)

IVF success rates depend upon a number of variables, including the age and health of the woman, health of the male sperm and female egg, and to some extent, the experience of the infertility center. Approximately 28 percent of IVF cycles result in pregnancy, and 82 percent of those pregnancies result in the birth of one or more children. (See "Patient information: In vitro fertilization (IVF) (Beyond the Basics)".)

Intracytoplasmic sperm injection (ICSI) — ICSI is a procedure that is performed in conjunction with IVF. With ICSI, a single sperm from the male partner is injected directly into a woman's egg (oocyte) in the laboratory. (See "Intracytoplasmic sperm injection".)

This technique can be useful in many cases of low sperm count. The pregnancy rate with ICSI is approximately 20 to 40 percent per cycle, although the technique is expensive.

Testicular extraction of sperm (TESE) — If a man's semen completely lacks sperm in the ejaculate (azoospermia), sperm can sometimes be directly removed from the testes. This is done in a minor surgery or by using a needle to aspirate semen under local anesthesia. If sperm can be found and extracted from the testis, the sperm will be used for ICSI and the fertilization rate of the oocyte is not very different from IVF. Thus, men with no sperm in the ejaculate can have a potential of fathering a child using these techniques.

Risks of ART — Most patients who undergo ART have no major complications. There are few to no risks for men, depending upon the procedure used to obtain sperm. Men who must undergo a procedure to retrieve sperm have a small risk of bleeding, damage to the testes, and infection.

Risks of ART for women include infection and damage to blood vessels, reproductive, or surrounding organs. The ovarian hyperstimulation syndrome (OHSS) is a potentially life-threatening complication that can occur during the process of IVF. (See "Patient information: In vitro fertilization (IVF) (Beyond the Basics)".)

There is some evidence that children of couples who become pregnant after IVF or ICSI have a slightly higher rate of chromosomal or congenital (birth) abnormalities and may have a higher rate of lower birth weight. This potential risk should be discussed with an infertility specialist. For now, couples can be reassured that these conditions are rare and the absolute risk of having a child with a congenital anomaly is low (the population baseline risk is 2 to 4 percent, which is potentially increased by about one-third with ART).

WHEN INFERTILITY CANNOT BE TREATED — Some treatments for male infertility fail, and some cases of male infertility simply cannot be treated at this time. If this is this case, an infertility specialist can advise the couple of available alternatives. Each couple's choice is a very personal one.

Men with irreversible infertility and testosterone deficiency may benefit from testosterone treatment. Although this treatment may not address a couple's goal of having a child, it can improve the male partner's sexual function and mood and help increase and maintain bone and muscle mass. (See "Patient information: Sexual problems in men (Beyond the Basics)".)

Artificial insemination with donor sperm — Some couples affected by irreversible male infertility consider artificial insemination of the female partner with donor sperm. Donor sperm may be obtained from a sperm bank, which screens men for infections, certain genetic problems, and provides a complete personal and family history. Most sperm banks keep the identity of their donors confidential; some banks give donors the option to be contacted by the children conceived with their sperm.

The decision to use donor sperm, whether from a known or unknown donor, can be complicated and difficult for a couple. Counseling may be helpful to help both partners discuss their feelings and the potential implications of using donor sperm. The American Society for Reproductive Medicine recommends that parents discuss their child's genetic origins with the child. The optimal age for this discussion is not known, although most experts recommend that the child be told before he or she is an adolescent (before approximately age 13) [2].

The use of donor sperm has a high success rate; pregnancy rates are about 50 percent after six cycles of insemination. Insemination may be done without the use of infertility medications or monitoring in women who have no infertility. Women who have difficulty conceiving may require intrauterine insemination or in vitro fertilization. (See "Patient information: Infertility treatment with gonadotropins (Beyond the Basics)".)

Adoption — Some couples affected by irreversible male infertility consider adopting a child. A healthcare provider or social worker can suggest resources for couples who decide to pursue this option. Approximately 2 to 4 percent of American families include an adopted child.

Childlessness — Some couples affected by irreversible male infertility decide to remain childless. Couples who decide to remain childless often face questions from friends or family regarding their decision. These questions can be hurtful for couples who have struggled with infertility. Couples often benefit from counseling after they decide to stop infertility treatments; communicating openly is important to maintain a healthy relationship.

WHERE TO GET MORE INFORMATION — Your healthcare provider is the best source of information for questions and concerns related to your medical problem.

This article will be updated as needed on our web site (www.uptodate.com/patients). Related topics for patients, as well as selected articles written for healthcare professionals, are also available. Some of the most relevant are listed below.

Patient level information — UpToDate offers two types of patient education materials.

The Basics — The Basics patient education pieces answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials.

Patient information: Infertility in women (The Basics)
Patient information: Infertility in couples (The Basics)
Patient information: Testicular cancer (The Basics)

Beyond the Basics — Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are best for patients who want in-depth information and are comfortable with some medical jargon.

Patient information: Ovulation induction with clomiphene (Beyond the Basics)
Patient information: Infertility treatment with gonadotropins (Beyond the Basics)
Patient information: In vitro fertilization (IVF) (Beyond the Basics)
Patient information: Evaluation of the infertile couple (Beyond the Basics)
Patient information: Sexual problems in men (Beyond the Basics)

Professional level information — Professional level articles are designed to keep doctors and other health professionals up-to-date on the latest medical findings. These articles are thorough, long, and complex, and they contain multiple references to the research on which they are based. Professional level articles are best for people who are comfortable with a lot of medical terminology and who want to read the same materials their doctors are reading.

Causes of male infertility
Causes of primary hypogonadism in males
Causes of secondary hypogonadism in males
Clinical features and diagnosis of male hypogonadism
Effects of cytotoxic agents on gonadal function in adult men
Evaluation of female infertility
Evaluation of male infertility
Induction of fertility in men with secondary hypogonadism
Intracytoplasmic sperm injection
Treatment of male infertility
Unexplained infertility

The following organizations also provide reliable health information.

- National Library of Medicine

(www.nlm.nih.gov/medlineplus/healthtopics.html)

- The Hormone Foundation

(www.hormone.org/public/other.cfm, also available in Spanish)

- American Society for Reproductive Medicine

(www.asrm.com/)

- Resolve: The National Infertility Association

(www.resolve.org)

- The International Council on Infertility Information Dissemination

(www.inciid.com)

Patient Support — There are a number of online forums where patients can find information and support from other people with similar conditions.

- About.com Infertility Conditions Forum

(http://infertility.about.com/forum)

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REFERENCES

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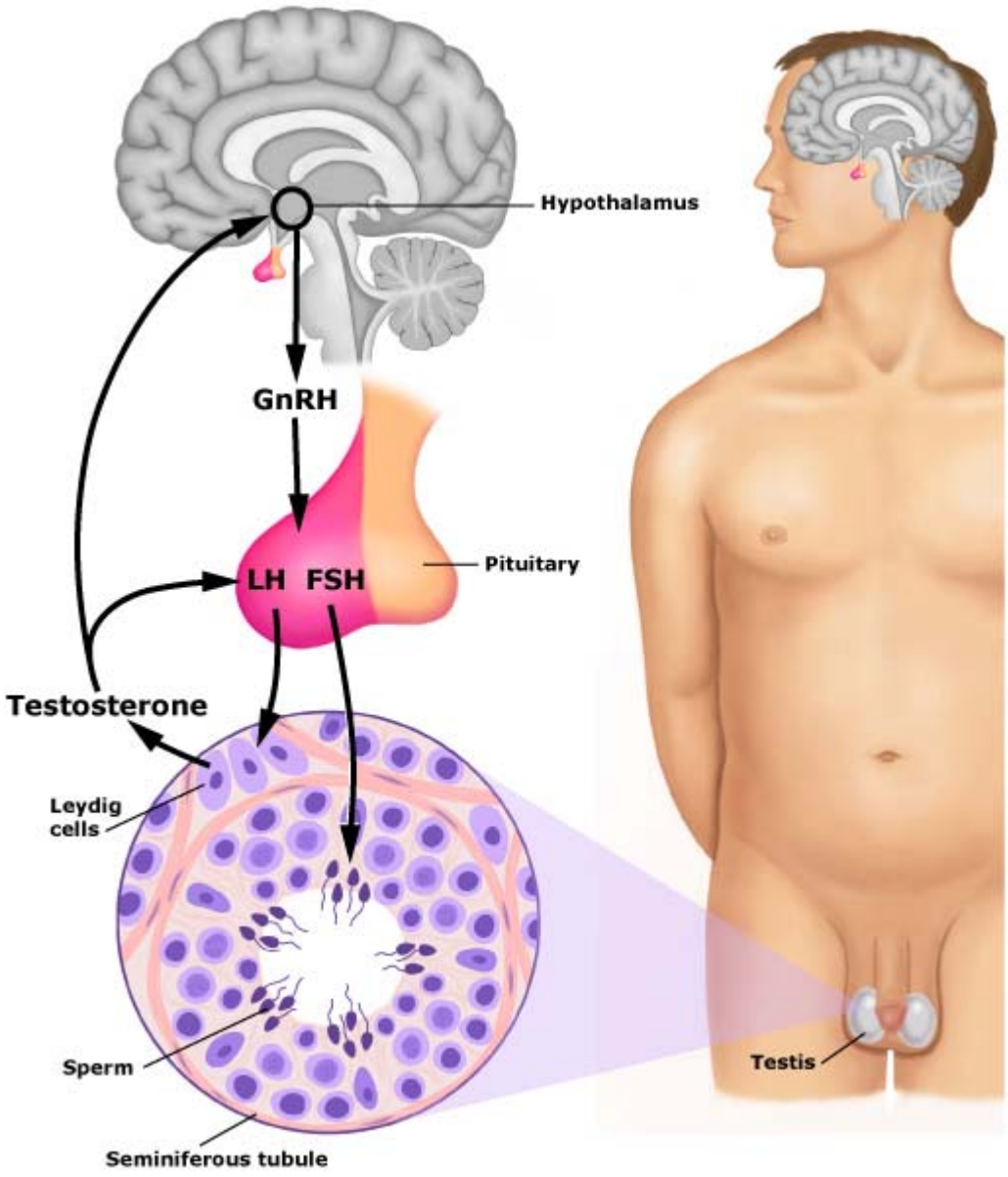
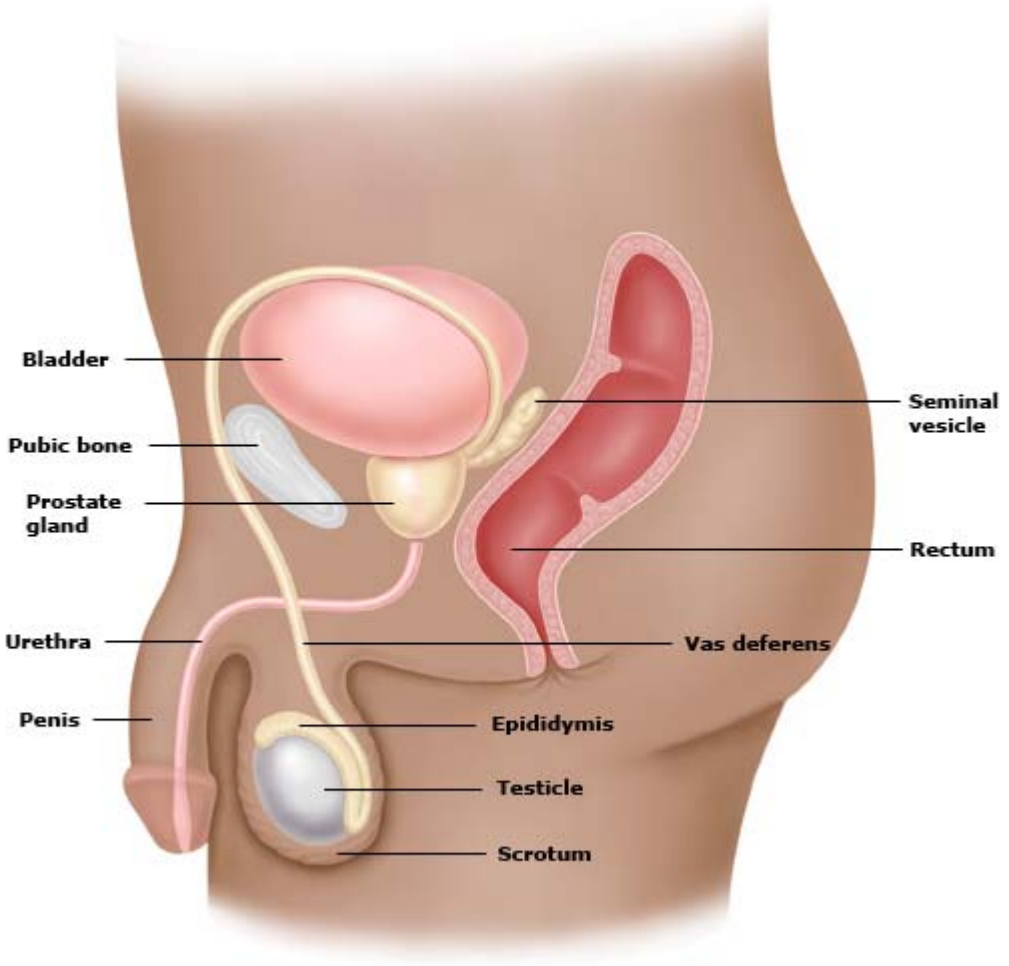
GRAPHICS

The hypothalamic-pituitary-gonadal axis



The hypothalamus secretes a hormone, GnRH, which stimulates the pituitary to secrete luteinizing hormone (LH) and follicle-stimulating hormone (FSH). LH stimulates the Leydig cells in the testicles to produce testosterone. FSH promotes the development of the sperm. Testosterone levels help to regulate the production of GnRH and LH.

Male reproductive anatomy



This drawing shows what a man's reproductive organs look like.