

Primary chemotherapy is sometimes recommended to patients with stage I or II nonseminomatous testis cancers. Also, some men may choose surveillance alone for a stage I tumor, which implies normal serum marker status and a normal abdominal CT scan. Up to 25% may be expected to develop recurrence, usually within 2 years, and chemotherapy is used after evidence of recurrence.

E. Male Infertility

Approximately 90% of all couples are able to conceive a child in the first year. For this reason, a male patient should not be evaluated for infertility unless he has tried to have a child for at least 1 year. Although it is difficult to localize the cause of infertility to one gender, the prevalence of male factor infertility in infertile couples is probably 25% to 50%. From a very basic perspective, male infertility is caused by problems delivering sperm, from either a decreased amount of sperm or a deficiency in the quality of the sperm. These problems can result from ED, retrograde ejaculation, ejaculatory duct obstruction, obstruction of the vas deferens, endocrine dysfunction, varicoceles, or genetic abnormalities.

HISTORY AND PHYSICAL EXAMINATION

The evaluation of a patient with infertility should begin with a thorough history and physical examination. During the history, the clinician should include questions about how long and how frequently the couple has been trying to conceive, prior pregnancies with current or previous partners, erectile function, and use of lubricants. A detailed past medical, surgical, social, and family history is also very important.

The physical examination should commence with an overall assessment of the patient's general health. Next, the clinician should focus on examination of the genitalia. The surface of the testicle should be closely examined because studies have shown an increased incidence of testicular cancer in patients with infertility. Testicular size and consistency should also be assessed. The normal testicle has a volume of approximately 20 mL and does not feel soft or spongy. In addition, the spermatic cord should be carefully examined to confirm the presence of a vas deferens on each side. The scrotum should be examined for the presence of a varicocele, with and without performance of the Valsalva maneuver. Finally, a rectal examination should be performed to palpate for abnormalities of the prostate and seminal vesicles.

SEMEN ANALYSIS

Semen analysis is probably the most important part of the evaluation of an infertile male patient. The patient should abstain from ejaculation for 2 to 7 days before the test, and clinical decision making should be based on at least two tests performed 7 days apart. Sperm concentration increases with days of abstinence. In a study from 2004 looking at the effect of frequency of ejaculation on sperm concentration, the concentration continued to increase after 10 days of abstinence. After the specimen has been collected by the patient, it should be delivered to the laboratory at body temperature as soon as possible. Motility significantly decreases after 2 hours.

Platinum-based chemotherapy is the standard for patients with advanced disease. Cure rates of 70% to 80% are achieved even in patients who have relatively bulky metastatic disease at presentation. Side effects of chemotherapy include renal dysfunction, neuropathy, Raynaud's phenomenon, hematologic toxicity, pulmonary toxicity, cardiovascular toxicity, and a 0.5% risk for secondary leukemia.

The most important parts of the microscopic examination of the semen sample are sperm concentration, morphology, and motility. The normal sperm concentration is greater than 20 million sperm per milliliter, and a value lower than 20 million per milliliter is termed *oligospermia*. The absence of sperm is termed *azoospermia*. Depending on the laboratory, sperm morphology is usually reported as a percentage. Typically, normal morphology in more than 50% of sperm examined is considered acceptable. Morphologic studies primarily assess the size and shape of the head and tail. Motility is also expressed as a percentage and refers to the percentage of sperm that are moving in a coordinated and progressive manner. Mortality values higher than 50% are considered to be normal. Abnormal sperm motility is termed *asthenospermia*, and abnormal morphology is *teratospermia*.

Other factors checked during a semen analysis include semen volume, pH, and fructose positivity. A semen volume between 2 and 4 mL is considered normal. A volume of less than 2 mL may be a sign of ejaculatory duct obstruction (absent fluid from vas deferens and seminal vesicle) or retrograde ejaculation. Because the testicles contribute only a small portion of the fluid released during ejaculation, a vasectomy should not affect ejaculate volume. The normal range of semen pH is 7.2 to 8.0. An acidic pH may be a sign of congenital absence of the vas deferens or seminal vesicle hypoplasia. Depending on the laboratory, the fructose test result should be positive or in the normal range. Fructose is made by the seminal vesicles and provides nutrition for the sperm. Low or absent fructose may also be a sign of ejaculatory duct obstruction or seminal vesicle hypoplasia.

OTHER DIAGNOSTIC TESTS

If a patient has an abnormal semen analysis, an endocrine evaluation should be performed. The complete initial endocrine evaluation includes measurements of LH, follicle-stimulating hormone (FSH), prolactin, and testosterone. These hormone levels should be checked in the morning (before 11 A.M.). In general, an elevated FSH is a bad prognostic sign indicating that the patient will not be found to have a correctable form of infertility. From a simplistic point of view, this is because the hypothalamic-pituitary axis is trying to stimulate sperm production but the testicle is not responding. Genetic testing in the form of a chromosome analysis (karyotype and Y-linked microdeletion assessment) should be considered in patients with severe oligospermia or azoospermia to rule out disorders such as Klinefelter's syndrome and abnormalities of the Y chromosome.

As long as a normal physical examination can be performed, there is no need to do a scrotal ultrasound study on patients with infertility. If the patient has a body habitus that makes physical

