Infertility with Testicular Cancer

Kevin A. Ostrowski, MD[a,*], Thomas J. Walsh, MD[b]

KEYWORDS

• Testicular cancer • Testicular germ cell tumors • Male infertility • Chemotherapy
• Radiation therapy • Retroperitoneal lymph node dissection (RPLND) • Surveillance

KEY POINTS

- Testicular cancer patients have baseline infertility before treatment due to systemic effects, endocrine changes, possible autoimmune effects, intrinsic testicular damage, and possible congenital abnormalities in testicular maturation.
- Sperm counts are further affected by orchiectomy and radiation and chemotherapy effects.
- There are significant psychological and sexual effects in patients undergoing surveillance or those requiring further treatment after orchiectomy.
- Cryopreservation should be offered to patients and their families before treatment.
- A full discussion of the gonadotoxic effects of cancer treatment and the possibility of sperm or testicular tissue cryopreservation, even in adolescent and prepubertal patients, should become standard of care.

INTRODUCTION

With a survival rate of more than 95%, testicular cancer is one of the most curable cancers worldwide. Although treatment is successful in most cases, the incidence of testicular cancer has doubled over the past 40 years and continues to rise.[1] A majority of patients undergoing treatment are of reproductive age; therefore, the use of gonadotoxic therapies can temporarily or permanently compromise their fertility.

There are many reasons for infertility in the testicular cancer population, including systemic and endocrine effects, autoimmune and intrinsic testicular damage, congenital abnormalities in testicular maturation, and the psychological and treatment effects of testicular cancer. The local and systemic effects of testicular cancer adversely affect spermatogenesis and lower sperm counts before treatment. Sperm counts are further affected by treatment with orchiectomy and the cytotoxic effects of radiation and chemotherapy. Retroperitoneal lymph node dissection (RPLND) can damage the sympathetic nerve plexus and have negative impacts on ejaculation.

The treatment of testicular cancer is evolving, and there is increased focus on preservation of fertility as well as the psychological and sexual effects of treatment. Patients have more fertility options than ever before with assisted-reproductive technology (ART). This article reviews the reasons for infertility in patients with testicular cancer both before and after treatment and evaluates current options for fertility preservation and infertility treatments.

DISCUSSION: DIAGNOSIS OF MALE INFERTILITY

Infertility is the inability to become pregnant after 1 year of unprotected intercourse and affects approximately 10% to 15% of couples[2]; 20% of cases involve male factors only and another 40%

[a] Department of Urology, Oregon Health and Science University, 3303 Southwest Bond Avenue, CH10U, Portland, OR 97239, USA; [b] Department of Urology, University of Washington School of Medicine, 1959 Northeast Pacific, Box 356510, Seattle, WA 98195, USA
* Corresponding author.
E-mail address: ostrowsk@ohsu.edu

Urol Clin N Am 42 (2015) 409–420
http://dx.doi.org/10.1016/j.ucl.2015.05.003

involve both male and female factors. Fertility is a couples phenomenon, and therefore all fertility discussions and treatment options should involve both patient and partner.[3] The evaluation for male infertility includes a thorough history and physical examination, semen analyses, and other specialized testing as needed (Fig. 1).

RELATIONSHIP BETWEEN INFERTILITY AND TESTICULAR CANCER

The relationship between infertility and testicular cancer has been well established. Multiple studies have shown decreased sperm counts in patients with newly diagnosed testicular cancer prior to cytotoxic treatment. Several studies suggest that testis cancer specifically may portend worse semen quality compared with other cancers.[4–7] In 208 patients evaluated with semen analysis after orchiectomy, only 27% of patients had baseline sperm counts greater than 10 million per mL.[8] Decreased spermatogenesis has been seen histologically in contralateral testicular biopsies at the time of orchiectomy in more than 2000 patients compared with healthy forensic autopsy controls.[9]

Conversely, multiple studies show that men evaluated for infertility have an increased risk of testicular cancer occurring later in life compared with men from the general population. In 2000, Jacobsen and colleagues[10] studied 32,442 Danish men evaluated for infertility and linked them to the Danish Cancer Registry from 1963 to 1995. They found men evaluated for infertility were 1.6 times more likely than the general population to develop testicular germ cell tumors (TGCTs) (standardized incidence ratio [SIR]; 95% CI, 1.3–1.9) subsequent to their infertility evaluation. Analyses stratified by specific semen characteristics showed that low sperm concentration (SIR 2.3; 95% CI, 1.6–3.2), poor sperm motility (SIR 2.5; 95% CI, 1.0–5.2), and high proportion of morphologically abnormal sperm (SIR 3.0; 95% CI, 0.8–7.6) were associated with an increased risk of testicular cancer. In the United States, Walsh and colleagues[11] studied a

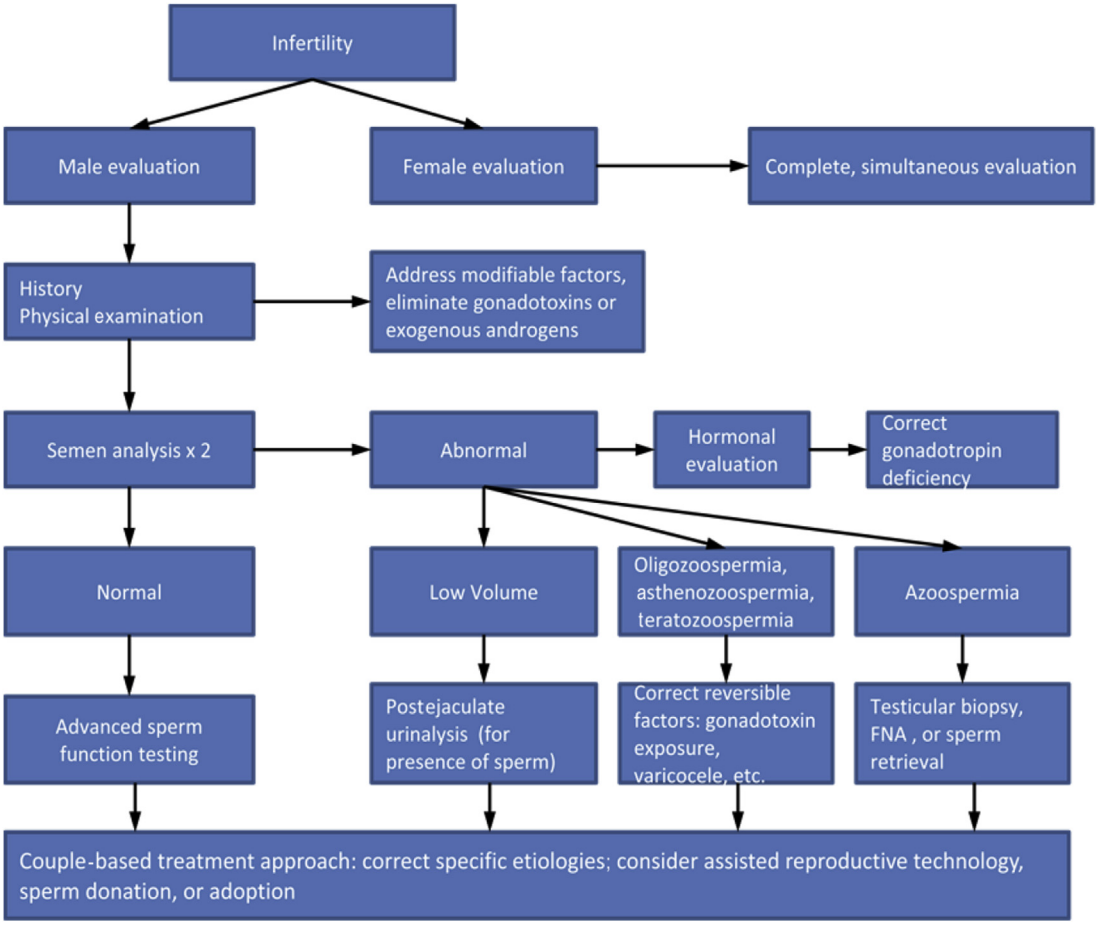

Fig. 1. Evaluation of the infertile couple. FNA, fine-needle aspiration.