Epidemiology and Diagnosis of Testis Cancer

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KEYWORDS

• Testis cancer • Germ cell tumors • Seminoma • Nonseminoma • Epidemiology

KEY POINTS

- Testis cancer is the most commonly diagnosed cancer in young men.
- Although there are multiple risk factors for testis cancer, most cases represent sporadic occurrences.
- Testis cancer most commonly presents at an early stage (clinical stage I) and is highly curable with radical orchiectomy.
- Advanced stages of testis cancer are highly curable with multimodality treatment options.
- There are no widely accepted screening strategies for germ cell tumors, but disease awareness and early detection via self-examination may improve outcomes for those diagnosed.

EPIDEMIOLOGY

The objective of this article is to examine and describe the epidemiology of testicular cancer. The article will outline the general disease patterns of germ cell cancers and potential risk factors that are seen in men with testicular cancer.

An estimated 1 out of every 250 men in the United States will be diagnosed with testis cancer in their lifetime.[1,2] The rate at which testis cancer is diagnosed and found was approximately 5.6 cases per 100,000 men in the United States in 2011, and for unknown reasons this rate has been increasing over the past decades in the United States and other Western countries.[1–5] The incidence of testis cancer peaks at age 25 to 29 years, with 14.3 cases diagnosed per 100,000 men per year, although testis cancer can affect men of all ages.[1,2]

There were an estimated 227,406 testicular cancer survivors in the United States in 2011. In 2014 there was an estimated 8820 new testis cancer diagnoses.[1,2]

The therapies for testis cancer are effective in most cases, as the death rate from testis cancer is relatively low, at 0.23 deaths per 100,000 men per year. The death rate has improved over the past decades, which speaks to the effectiveness of the current multimodality treatment strategies employed for testis cancer. Despite the effectiveness of treatment, anestimated 380 men were expected to die from the disease in 2014 in the United States alone, which was less than 0.2% of all men currently surviving with a history with testicular cancer.[1,2]

Fig. 1 depicts the relationship of the changing incidence and death rates of testis cancer from 1975 to 2011.[1]

The 5-year survival rate for all stages of testis cancer is 96.6%, meaning the vast majority of patients diagnosed with testis cancer can be cured of disease. Testis cancer is one of the few malignancies that can commonly be cured even after it has metastasized. The 5-year survival for localized, regional, or distant disease is 99.2%,

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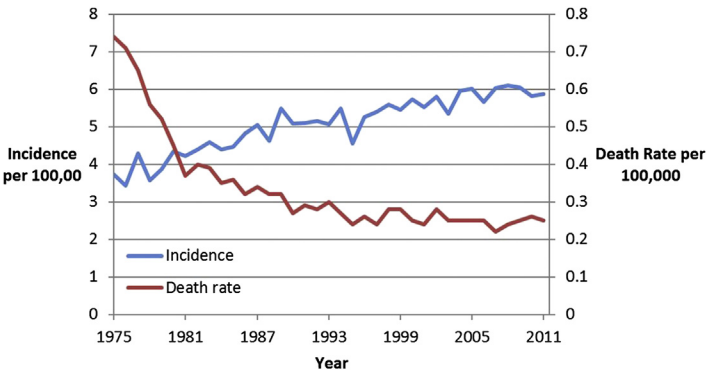

Fig. 1. Incidence and death rates of testicular cancer over time. (*Data from* SEER Cancer Statistics. 2014. Available at: seer.cancer.gov. Accessed November 22, 2014.)

96.0%, and 73.1%, respectively, highlighting the curability of even advanced germ cell tumors. In contrast, patients diagnosed with lung cancer, pancreatic cancer, or esophageal cancer only have a 5-year survival rate of 16.8%, 6.7%, and 17.5%, respectively.[1,2]

RISK FACTORS FOR TESTIS CANCER

Box 1 lists the risk factors, which incude personal history, cryptorchism, family history, intratubular germ cell neoplasia, race, geography, environmental exposures, infertility and microcalcifications.

Personal History

One of the most significant risk factors for development of testis cancer is a personal history of testis cancer. A man has a 12-fold increased risk of developing another primary tumor after his initial diagnosis of testis cancer, which occurs in approximately 2% to 3% of testis tumor survivors.[6,7] Close medical follow-up and diligent patient self-examination are key in facilitating the early detection of second primary tumors. Overall, bilateral germ cell tumors comprise 2% of all testis tumors seen on initial presentation.[8]

Box 1
Risk factors for testicular cancer

- Personal history of testicular cancer in contralateral testicle
- Cryptorchidism
- Family history
- Intratubular germ cell neoplasia
- Race (highest among whites, lowest among blacks and Asians)
- Geography
- Environmental exposures
- Infertility
- Microcalcifications (association)

Cryptorchidism

History of an undescended testicle, or cryptorchidism, increases the risk of developing a testis tumor by up to eightfold if left surgically uncorrected or corrected after puberty.[9] If corrected with orchiopexy prior to puberty, the relative risk of developing testis cancer is decreased to twofold.[9,10]

Family History

There is evidence suggesting that a family history of testis cancer is a significant risk factor for development of the disease. However, this may be confounded by the result of shared environmental exposures. Some estimate that brothers and sons of men with testis cancer have as high as a 10-fold increased risk of developing testis cancer themselves.[11] There appears to be a stronger link with brothers compared with fathers as a risk factor for developing testis cancer.[12]

Intratubular Germ Cell Neoplasia

Intratubular germ cell neoplasia, also known as carcinoma in situ, is a well-established risk factor for testis cancer. It is often an associated finding with cryptorchid testicles, and contralateral testicles in men with a history of testis cancer.[11]

Race

There is wide variability in the rates of testis cancer based on race. The highest rates are among Caucasians, and the lowest rates among blacks and Asians. In the United States, the incidence of testis cancer among Caucasians is roughly 5 times higher than among blacks, 4 times higher than among Asians, and one-and-a-half times higher