

# HOSPITAL PHYSICIAN®

## UROLOGY BOARD REVIEW MANUAL

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The *Hospital Physician Urology Board Review Manual* is a peer-reviewed study guide for residents and practicing physicians preparing for board examinations in urology. Each manual reviews a topic essential to the current practice of urology.

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## Seminoma

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## Table of Contents

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Epidemiology . . . . .	2
Etiology, Clinical Presentation, and Diagnosis . . . . .	2
Staging . . . . .	3
Approach to Treatment . . . . .	6
References . . . . .	11

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# Seminoma

Fadi N. Joudi, MD, FRCSC

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## EPIDEMIOLOGY

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Testicular germ cell tumors (GCTs) account for 1% to 2% of all neoplasms in males and are the most common malignancy in men aged 20 to 35 years.<sup>1</sup> In 2005, there were an estimated 8010 new cases of testicular cancer and 390 testicular cancer–attributable deaths in the United States.<sup>2</sup> Testicular cancer is seen principally in young whites and rarely in African Americans, with a ratio between 4:1 and 5:1, although it was closer to 40:1 in the U.S. military according to 1 study.<sup>3</sup> Approximately 2% to 3% of testicular tumors are bilateral, occurring either simultaneously or successively.<sup>4</sup>

For clinical purposes, the World Health Organization divides GCTs into 2 entities: seminomas and nonseminomatous germ cell tumors (NSGCTs, or nonseminomas). Seminomas are composed of cells that are considered the neoplastic counterparts of primitive germ cells. NSGCTs are composed of 4 cell types: embryonal cell carcinoma, yolk sac tumor, teratoma, and choriocarcinoma.<sup>5</sup> Seminomas account for half of all GCTs and most frequently appear in the fourth decade of life; NSGCTs comprise the remaining 50% of GCTs and most frequently present in the third decade of life. While seminoma is the most common tumor of a single type, NSGCT is usually composed of mixed cell types. As the stem cells of NSGCT are more malignant, mixed tumors that include seminoma and nonseminomatous components are treated as NSGCTs.<sup>6</sup>

## HISTOLOGIC VARIANTS

There are 3 subtypes of seminomas: classic, anaplastic, and spermatocytic. Classic seminoma accounts for 82% to 85% of all seminomas and occurs most commonly in men aged 30 to 40 years but can occur in men aged 40 years and older. Histologically, classic seminoma is composed of islands or sheets of relatively large cells with clear cytoplasm and densely staining nuclei.<sup>7</sup> At least 15% of all seminomas contain trophoblastic giant cells, the presence of which corresponds to  $\beta$ -human chorionic gonadotropin ( $\beta$ -hCG) production.<sup>8</sup>

Anaplastic seminoma accounts for 5% to 10% of all seminomas and has an age distribution similar to that of

the classic subtype. Histologic characteristics of anaplastic seminoma include increased mitotic activity ( $\geq 3$  mitoses per high-power field), nuclear pleomorphism, and cellular anaplasia.<sup>9</sup> Differentiating anaplastic from classic seminoma is worthwhile, as up to 30% of patients who die from seminoma have anaplastic morphology. Features suggesting greater aggressiveness of this subtype include increased mitotic activity, higher rate of local invasion, and increased rate of metastatic spread. However, when compared stage to stage, treatment outcomes for patients with classic versus anaplastic seminoma have been similar,<sup>10</sup> suggesting that anaplastic seminoma may have a greater metastatic potential and patients with this subtype may present at an advanced stage.

Spermatocytic seminoma accounts for 2% to 12% of all seminomas, and approximately half occur in men older than 50 years. Cells usually vary in size and have deeply pigmented cytoplasm and rounded nuclei containing characteristic filamentous chromatin. These tumors tend to have an extremely low metastatic potential and a favorable prognosis.<sup>11</sup> Some authors advocate treating stage I spermatocytic seminoma with inguinal orchiectomy alone.<sup>7,11</sup>

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## ETIOLOGY, CLINICAL PRESENTATION, AND DIAGNOSIS

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### ETIOLOGY

The etiology of GCT is unknown, but many contributing factors (congenital or acquired) have been proposed. Cryptorchidism is a well-established risk factor for testicular cancer and is associated with several times the risk of GCT when compared with normally descended testes. Approximately 7% to 10% of patients with testicular tumors have a history of cryptorchidism.<sup>12</sup> Recent epidemiologic studies have reported the relative risk of testicular cancer in patients with cryptorchidism to be between 3 and 14 times the normal expected incidence.<sup>13–15</sup> In 5% to 20% of patients with a history of cryptorchidism and subsequent development of testicular cancer, the tumor occurs in the contralateral normally descended testis.<sup>16</sup> An abdominal