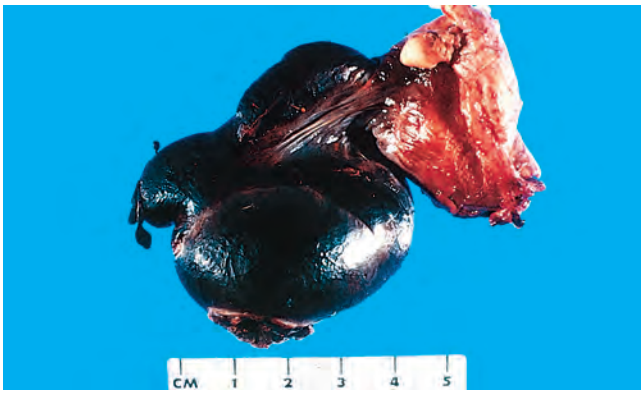

Figure 21-22 Torsion of testis.

Spermatic Cord and Paratesticular Tumors

Lipomas are common lesions involving the proximal spermatic cord, identified at the time of inguinal hernia repair. Although diagnosed as "lipomas," many of these lesions probably represent retroperitoneal adipose tissue that has been pulled into the inguinal canal along with the hernia sac, rather than a true neoplasm.

The most common benign paratesticular tumor is *adenomatoid tumor*. Although these lesions are mesothelial in nature, they are not referred to as mesotheliomas to distinguish them from other mesothelial lesions that may occur at this site. Adenomatoid tumors are usually small nodules, typically occurring near the upper pole of the epididymis. Although grossly well circumscribed, microscopically they may be minimally invasive into the adjacent testis. The importance of this lesion is that it is one of the few benign tumors that occur near the testis. If the pathologist can identify the nature of this lesion in intraoperative frozen sections, local excision of the adenomatoid tumor can spare the patient from an orchiectomy.

The most common malignant paratesticular tumors are rhabdomyosarcomas in children and liposarcomas in adults.

Testicular Tumors

Testicular neoplasms span an amazing gamut of anatomic types and can be divided into two major categories: germ cell tumors (95%) and sex cord-stromal tumors (Table 21-5). Germ cell tumors are subdivided into seminomas and nonseminomas. Most germ cell tumors are aggressive cancers capable of rapid, wide dissemination, although with current therapy most can be cured. Sex cord-stromal tumors, in contrast, are generally benign.

Table 21-5 Pathologic Classification of Common Testicular Tumors

Germ Cell Tumors
Seminomatous tumors
Seminoma
Spermatocytic seminoma
Nonseminomatous tumors
Embryonal carcinoma
Yolk sac (endodermal sinus) tumor
Choriocarcinoma
Teratoma
Sex Cord-Stromal Tumors
Leydig cell tumor
Sertoli cell tumor

Germ Cell Tumors

In the 15- to 34-year age group, testicular germ cell tumors constitute the most common tumor of men and cause approximately 10% of all cancer deaths. The incidence of testicular tumors in the United States is approximately 6 per 100,000, resulting in approximately 300 deaths per year. For unexplained reasons there has been worldwide increase in the incidence of these tumors in recent years. In the United States these tumors are much more common in whites than in blacks (ratio 5:1).

Environmental Factors. Environmental factors play a role in testicular germ cell tumors, as demonstrated by population migration studies. For example, the incidence of testicular germ cell tumors in Finland is about two times lower than in Sweden, but second generation Finnish immigrants to Sweden have a tumor incidence that approaches that of the Swedish population. Testicular germ cell tumors are associated with a spectrum of disorders collectively known as *testicular dysgenesis syndrome (TDS)*. Components of this syndrome include cryptorchidism, hypospadias, and poor sperm quality. It has been proposed that these conditions are increased by in utero exposures to pesticides and nonsteroidal estrogens. The most important association is with cryptorchidism, which is seen with approximately 10% of testicular germ cell tumors. Curiously, Klinefelter syndrome is associated with a greatly increased risk (50 times normal) for development of mediastinal germ cell tumors, but these patients do not develop testicular tumors.

Genetic Factors. There is a strong familial predisposition associated with the development of testicular germ cell tumors. The relative risk of these tumors is four times higher than normal in fathers and sons of affected patients and is 8 to 10 times higher in brothers. Several genetic loci have been linked to familial germ cell tumor risk, including the genes encoding the ligand for the receptor tyrosine kinase KIT and BAK, which you will recall is an important inducer of apoptotic cell death (Chapter 1). Interestingly, these genes are also thought to play a role in gonadal development.

Classification. A simple classification of the most common types of testicular tumors is presented in Table 21-5. Two broad groups are recognized. *Seminomatous tumors* are composed of cells that resemble primordial germ cells or early gonocytes. The *nonseminomatous tumors* may be composed of undifferentiated cells that resemble embryonic stem cells, as in the case of embryonal carcinoma, but the malignant cells may also differentiate along other lineages, generating yolk sac tumors, choriocarcinomas and teratomas. Germ cell tumors may have a single tissue component, but in approximately 60% of cases the tumors contain mixtures of seminomatous and nonseminomatous components and multiple tissues.

Pathogenesis. **Most testicular germ cell tumors originate from a precursor lesion called intratubular germ cell neoplasia (ITGCN).** The exceptions to this rule are pediatric yolk sac tumors and teratomas, and adult spermatocytic