

serous (tubal type) epithelium, are presumed to arise in remnants of the müllerian duct and are of little significance.

Tumors of the fallopian tube are uncommon. Benign tumors include *adenomatoid tumors* (mesotheliomas), which occur subserosally on the tube or sometimes in the mesosalpinx. These small nodules are the exact counterparts of the adenomatoid tumors that occur in the testes or epididymis (Chapter 21). Primary *adenocarcinoma* of the fallopian tubes is rare. It usually presents as a dominant tubal mass that may be detected by pelvic examination.

## OVARIES

The most common lesions encountered in the ovary are functional or benign cysts and tumors. Neoplastic disorders can be grouped according to their origin from each of the three main ovarian cell types: (1) müllerian epithelium, (2) germ cells, and (3) sex cord-stromal cells. Primary inflammations of the ovary (oophoritis) are uncommon, and on rare occasions may have an autoimmune basis (autoimmune oophoritis); the autoimmune reactions affect the ovarian follicles and may lead to infertility.

### Nonneoplastic and Functional Cysts

#### Follicle and Luteal Cysts

*Cystic follicles* are very common in the ovary. They originate from unruptured graafian follicles or in follicles that have ruptured and immediately sealed.

## MORPHOLOGY

These cysts are usually multiple. They range in size up to 2 cm in diameter, are filled with a clear serous fluid, and are lined by a gray, glistening membrane. On occasion, larger cysts exceeding 2 cm (follicle cysts) may be diagnosed by palpation or ultrasonography; these may cause pelvic pain. Granulosa lining cells are present if the intraluminal pressure has not been so great as to cause their atrophy. The outer theca cells may be conspicuous due to increased amounts of pale cytoplasm (a change referred to as luteinization). As discussed subsequently, when luteinization is pronounced (hyperthecosis), it may be associated with increased estrogen production and endometrial abnormalities.

**Luteal cysts** (corpora lutea) are present in the normal ovaries of women of reproductive age. These cysts are lined by a rim of bright yellow tissue containing luteinized granulosa cells. They occasionally rupture and cause a peritoneal reaction. Sometimes the combination of old hemorrhage and fibrosis may make their distinction from endometriotic cysts difficult.

#### Polycystic Ovaries and Stromal Hyperthecosis

**Polycystic ovarian syndrome (PCOS)** is a complex endocrine disorder characterized by hyperandrogenism,

Other fallopian adenocarcinomas come to attention due to abnormal discharge, bleeding, or (occasionally) abnormal cells in a Pap smear. Approximately one half of tumors are stage I at diagnosis, but nearly 40% of affected patients are dead within 5 years, with higher stage tumors pursuing an even more aggressive course. Patients are typically treated with ovarian cancer chemotherapy protocols. Recently, data have accumulated to suggest that at least a subset of “serous ovarian cancers” actual arise from the epithelium of the fallopian tube (discussed later).

**menstrual abnormalities, polycystic ovaries, chronic anovulation, and decreased fertility.** Formerly called Stein Leventhal syndrome, it affects 6-10% of reproductive age women worldwide. It is also associated with obesity, type 2 diabetes, and premature atherosclerosis, all of which may be indicative of an underlying metabolic disorder. The etiology of PCOS remains incompletely understood. It is marked by a dysregulation of enzymes involved in androgen biosynthesis and excessive androgen production, which is considered to be a central feature of this disorder. In addition, women with PCOS show insulin resistance and altered adipose tissue metabolism, which contribute to the development of both diabetes and obesity.

The central morphologic abnormality of PCOS is numerous cystic follicles or follicle cysts that enlarge the ovaries. However, polycystic ovaries are detected in 20% to 30% of all women, so this finding is not specific. In addition, due to an increase in free serum estrone levels, women with PCOS are at risk for endometrial hyperplasia and carcinoma.

*Stromal hyperthecosis*, also called cortical stromal hyperplasia, is a disorder of ovarian stroma most often seen in postmenopausal women, but it may overlap with PCOS in younger women. The disorder is characterized by uniform enlargement of the ovary (up to 7 cm), which has a white to tan appearance on sectioning. The involvement is usually bilateral and microscopically shows hypercellular stroma and luteinization of the stromal cells, which are visible as discrete nests of cells with vacuolated cytoplasm. The clinical presentation and effects on the endometrium are similar to those of PCOS, although virilization may be even more striking.

A physiologic condition mimicking the aforementioned syndromes is *theca lutein hyperplasia of pregnancy*. In response to pregnancy hormones (gonadotropins), theca cells proliferate and the perifollicular zone expands. As the follicles regress, the concentric theca-lutein hyperplasia may appear nodular. This change is not to be confused with true luteomas of pregnancy (see later).

### Ovarian Tumors

There are numerous types of ovarian tumors. About 80% are benign, and these occur mostly in young women between the ages of 20 and 45 years. Borderline tumors