CHAPTER

22 Female Genital Tract

PBD9 Chapter 22 and PBD8 Chapter 22: The Female Genital Tract

BP9 Chapter 18 and BP8 Chapter 19: Female Genital System and Breast

1 A 31-year-old, sexually active woman has had a mucopurulent vaginal discharge for 1 week. On pelvic examination, the cervix appears reddened around the os, but no erosions or mass lesions are present. A Pap smear shows numerous neutrophils, but no dysplastic cells. A cervical biopsy specimen shows marked follicular cervicitis. Which of the following infectious agents is most likely to produce these findings?

- **A** *Candida albicans*
- **B** *Chlamydia trachomatis*
- **C** *Gardnerella vaginalis*
- **D** Herpes simplex virus
- **E** Human papillomavirus
- **F** *Neisseria gonorrhoeae*
- **G** *Trichomonas vaginalis*

2 A 31-year-old woman has had vulvar pruritus along with a thick, whitish, odorless, globular vaginal discharge for the past week. On pelvic examination, the cervix appears erythematous, but there are no erosions or masses. A Pap smear shows budding cells and pseudohyphae. No dysplastic cells are present. Which of the following infectious agents is most likely to produce these findings?

- **A** *Candida albicans*
- **B** *Chlamydia trachomatis*
- **C** *Neisseria gonorrhoeae*
- **D** *Trichomonas vaginalis*
- **E** *Ureaplasma urealyticum*

3 A 17-year-old sexually active girl has had pelvic pain for 1 week. A pelvic examination shows mild erythema of the ectocervix and pain on palpation of right adnexa. A Pap smear shows many neutrophils, but no dysplastic cells. A cervical culture grows *Neisseria gonorrhoeae.* If the infection is not adequately treated, she will be at increased risk for which of the following complications?

- **A** Cervical carcinoma
- **B** Dysfunctional uterine bleeding
- **C** Ectopic pregnancy
- **D** Endometrial hyperplasia
- **E** Endometriosis
- **F** Placenta previa

4 A 25-year-old woman has experienced discomfort during sexual intercourse for the past month. On physical examination, there are no lesions of the external genitalia. Pelvic examination shows a focal area of swelling on the left posterolateral inner labium that is very tender on palpation. A 3-cm cystic lesion filled with purulent exudate is excised. In which of the following structures is this lesion most likely to develop?

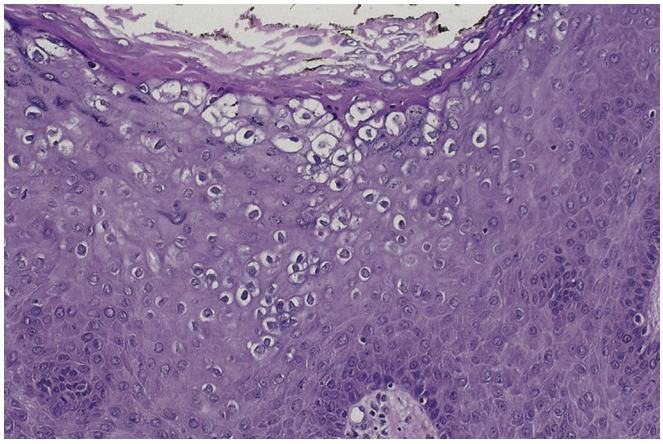
- **A** Bartholin gland
- **B** Gartner duct
- **C** Hair follicle
- **D** Urogenital diaphragm
- **E** Vestibular bulb

5 A 53-year-old postmenopausal woman is concerned about pale areas on her labia that have been slowly enlarging for the past year. The areas cause discomfort and become easily irritated. Physical examination shows pale gray to parchment-like areas of skin that involve most of the labia majora, labia minora, and introitus. The introitus is narrowed. A biopsy specimen is taken and microscopically shows thinning of the squamous epithelium, a dense band of upper dermal hyaline collagen, and scattered upper dermal mononuclear inflammatory cells. What is the most likely diagnosis?

- **A** Extramammary Paget disease
- **B** Human papillomavirus infection
- **C** Lichen sclerosus et atrophicus
- **D** Pelvic inflammatory disease
- **E** Vulvar intraepithelial neoplasia

6 A 40-year-old woman has noted pruritic patches on her vulva for the past 4 months. On physical examination there are multiple 1.5- to 3-cm white, scaly plaques on the vulva. A biopsy of one lesion is taken, and on microscopic examination, it shows epidermal thickening with hyperkeratosis and intense dermal inflammation. Mitoses are seen in keratinocytes, but they exhibit no atypia. What is the most likely diagnosis?

- **A** Condyloma acuminatum
- **B** Contact dermatitis
- **C** Psoriasis
- **D** Squamous cell hyperplasia
- **E** Vulvar intraepithelial neoplasia



7 A 36-year-old sexually active woman has noticed that warty vulvar lesions have been increasing in size and number over the past 5 years. On physical examination, there are multiple 0.5- to 2-cm, red-pink, flattened lesions with rough surfaces present on the vulva and perineum. One of the larger lesions is excised; its microscopic appearance is shown in the figure. Which of the following infectious agents is most likely to produce these lesions?

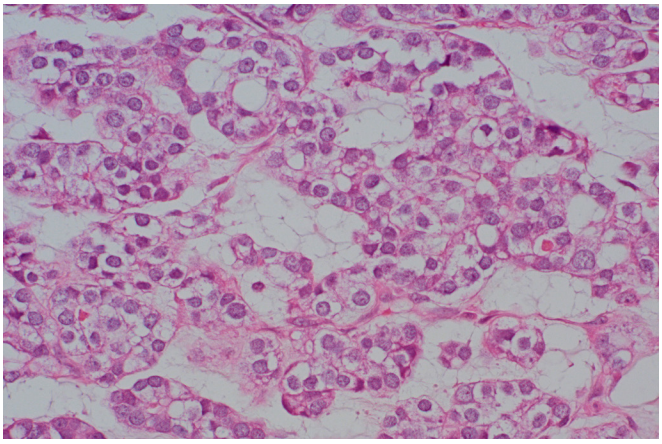
A *Candida albicans*
B *Chlamydia trachomatis*
C *Haemophilus ducreyi*
D Human papillomavirus
E *Treponema pallidum*

8 A 57-year-old woman recently noticed a pale area of discoloration on the labia. Pelvic examination shows the presence of a 0.7-cm flat, white area on the right labia majora. A biopsy specimen is obtained and on microscopic examination shows dysplastic cells that occupy half the thickness of the squamous epithelium, with minimal underlying chronic inflammation. In situ hybridization shows human papillomavirus type 16 DNA in the epithelial cells. What is the most likely diagnosis?

A Chronic vulvitis
B Condyloma acuminatum
C Lichen sclerosus et atrophicus
D Squamous hyperplasia
E Vulvar intraepithelial neoplasia

9 A 52-year-old woman has noted increasing size of a red, pruritic lesion on her left labium over the past 7 months. On physical examination, this rough, scaly lesion is 0.4 × 0.9 cm. The perineum appears normal; there is no lymphadenopathy, and there are no rectal lesions. A Pap smear shows no abnormal findings. The lesion is excised and on microscopic examination shows large atypical cells lying singly or in small clusters within the epidermis. These cells have abundant cytoplasm that stains with periodic acid–Schiff (PAS). What is the most likely diagnosis?

A Condylomata acuminata
B Extramammary Paget disease
C Lichen sclerosus et atrophicus
D Lichen simplex chronicus
E Vulvar intraepithelial neoplasia



10 An 18-year-old sexually active woman has had dyspareunia followed by vaginal bleeding for the past month. On pelvic examination, a red, friable, 2.5-cm nodular mass is seen on the anterior wall of the upper third of the vagina. The microscopic appearance of a biopsy specimen is shown in the figure. Which of the following conditions is likely to have contributed most to the origin of this neoplasm?

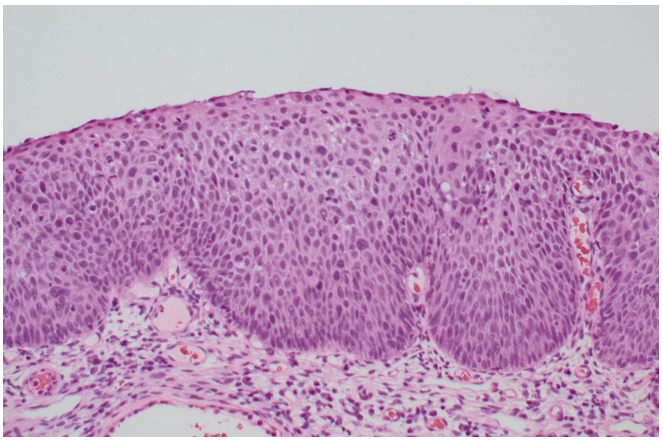
A Congenital adrenal hyperplasia
B Diethylstilbestrol (DES) exposure
C Human papillomavirus infection
D Polycystic ovary syndrome (PCOS)
E *Trichomonas* vaginitis

11 A 4-year-old girl is brought to the physician by her parents, who noticed bloodstained underwear and "something" protruding from her external genitalia. On physical examination, there are polypoid, grapelike masses projecting from the vagina. Histologic examination of a biopsy specimen from the lesion shows small, round tumor cells, some of which have eosinophilic straplike cytoplasm. Immunohistochemical staining shows desmin, vimentin, and myogenin in these cells. What is the most likely diagnosis?

A Clear cell carcinoma
B Infiltrating squamous cell carcinoma
C Neuroblastoma
D Sarcoma botryoides
E Vulvar intraepithelial neoplasia

12 A healthy 30-year-old woman comes to the physician for a routine health maintenance examination. No abnormalities are found on physical examination. A screening Pap smear shows cells consistent with a low-grade squamous intraepithelial lesion (LSIL). Subsequent cervical biopsy specimens confirm the presence of cervical intraepithelial neoplasia (CIN) I. Which of the following risk factors is most likely related to her Pap smear findings?

A Diethylstilbestrol (DES) exposure
B Multiple sexual partners
C Oral contraceptive use
D Prior treatment for a malignancy
E Vitamin B_{12} (cobalamin) deficiency



13 A 33-year-old woman comes to her nurse practitioner for a routine health maintenance examination. On physical examination, there are no abnormal findings. A Pap smear shows abnormalities; colposcopy and a biopsy are performed. The figure shows the microscopic appearance of the biopsy specimen. Which of the following is the best strategy to prevent the development of this lesion?

A Avoidance of tobacco products
B Consumption of a diet rich in vegetables
C Maintenance of an ideal body weight
D Use of oral contraceptives
E Vaccination for human papillomavirus

14 A 42-year-old woman has a Pap smear as part of a routine health maintenance examination. There are no remarkable findings on physical examination. The Pap smear shows cells consistent with a high-grade squamous intraepithelial lesion (HSIL) with human papillomavirus type 18. Cervical biopsy specimens are obtained, and microscopic examination confirms the presence of extensive moderate dysplasia (CIN II) along with intense chronic inflammation with squamous metaplasia in the endocervical canal. What is the most likely explanation for proceeding with cervical conization for this patient?

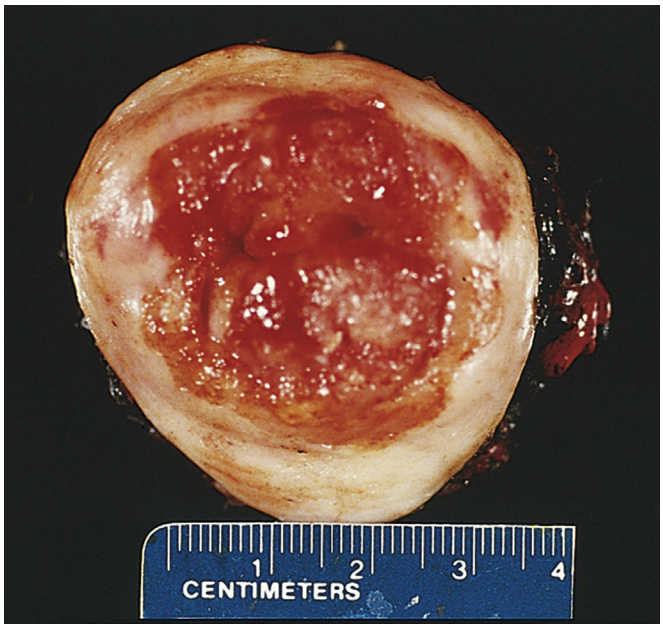
A Her reproductive years are over
B HPV infection cannot be treated
C Perimenopausal state
D Presence of chronic cervicitis
E Risk for invasive carcinoma

15 A 28-year-old sexually active woman comes to her physician's assistant for a routine health maintenance examination. There are no abnormal findings on physical examination. She has been taking oral contraceptives for the past 10 years. A Pap smear shows a high-grade squamous epithelial lesion (HSIL), also termed *moderate dysplasia,* or *cervical intraepithelial neoplasia* (CIN) II. What is the most likely molecular pathogenesis for this finding?

A Estrogenic stimulation of cell proliferation
B Inheritance of a tumor suppressor gene mutation
C Recurrent gonococcal cervicitis
D Up-regulation of antiapoptosis genes
E Viral inactivation of the *RB1* gene product

16 A 34-year-old woman has a routine Pap smear for the first time. The results indicate that dysplastic cells are present, consistent with a high-grade squamous intraepithelial lesion (HSIL), also called *cervical intraepithelial neoplasia* (CIN) III. She is referred to a gynecologist, who performs colposcopy and takes multiple cervical biopsy specimens that all show CIN III. Conization of the cervix shows a focus of microinvasion at the squamocolumnar junction. Based on these findings, what is the next most likely step in treating this patient?

A Bone scan for metastatic lesions
B Course of radiation therapy
C No further therapy
D Pelvic exenteration
E Vaginal hysterectomy



17 A 45-year-old woman has had a small amount of vaginal bleeding and a brownish, foul-smelling discharge for the past month. On pelvic examination, there is a 3-cm lesion on the ectocervix, shown in the figure. Microscopic examination of the lesion is most likely to show which of the following?

A Adenocarcinoma
B Cervical intraepithelial neoplasia
C Chronic cervicitis
D Clear cell carcinoma
E Extramammary Paget disease
F Squamous cell carcinoma

18 A 43-year-old woman has had postcoital bleeding for 6 months. She experienced menarche at age 11 years and has had 12 sexual partners during her life. She continues to have regular menstrual cycles without abnormal intermenstrual bleeding. Pelvic examination shows a focal, slightly raised area of erythema on the cervix at the 5 o'clock position. A Pap smear shows a high-grade squamous intraepithelial lesion (HSIL), also termed *severe cervical intraepithelial neoplasia* (CIN III). Analysis of cells from the cervix shows the presence of human papillomavirus type 16. Which of the following malignancies is she at greatest risk of developing if the lesion is not treated?

- **A** Clear cell carcinoma
- **B** Immature teratoma
- **C** Krukenberg tumor
- **D** Leiomyosarcoma
- **E** Sarcoma botryoides
- **F** Squamous cell carcinoma

19 A 13-year-old girl began menstruation 1 year ago. She now has abnormal uterine bleeding, with menstrual periods that are 2 to 7 days long and 2 to 6 weeks apart. The amount of bleeding varies from minimal spotting to a very heavy flow. On physical examination, there are no remarkable findings. A pelvic ultrasound scan shows no abnormalities. Which of the following is most likely to produce these findings?

- **A** Anovulatory cycles
- **B** Ectopic pregnancy
- **C** Endometrial carcinoma
- **D** Endometrial polyp
- **E** Uterine leiomyomata

20 A 41-year-old G5, P5 woman has noticed lower abdominal pain with fever for the past 2 days. She delivered a normal term infant 1 week ago. On examination, she has a temperature of 37.4° C. There is a foul-smelling vaginal discharge. Which of the following pathologic findings is she most likely to have?

- **A** Cervical intraepithelial neoplasia
- **B** Endometrial neutrophilic infiltrates
- **C** Myometrial smooth muscle neoplasm
- **D** Ovarian endometrioma
- **E** Tubal granulomatous inflammation
- **F** Vaginal trichomoniasis

21 A 35-year-old woman presents with infertility. She has had dysmenorrhea, dyspareunia, and pelvic pain on defecation for 4 years. Laparoscopic examination reveals red-blue nodules on the surface of the uterus and extensive adhesions between ovaries and the fallopian tubes. Histologic examination of a biopsy from one of the nodules shows hyperplastic endometrial glands and hemorrhage in the stroma. Molecular analysis of the biopsy material reveals hypomethylation of the promoter regions of the genes that encode steroidogenic factor 1 and estrogen receptor beta. There are no mutations in the *PTEN*, *KRAS*, and *MLH1* genes. Which of the following is an appropriate treatment modality in this case?

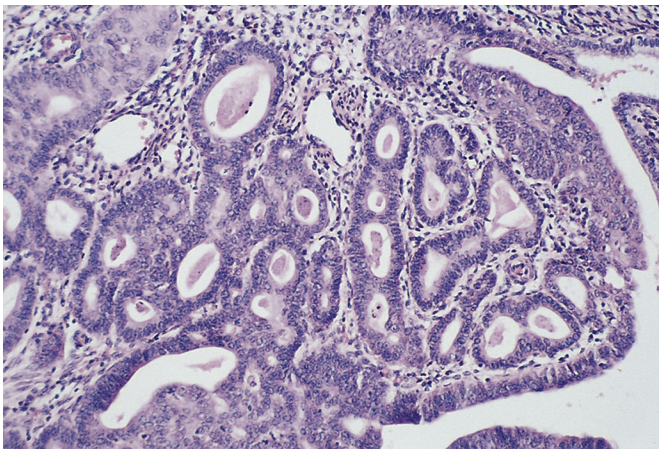
- **A** Aromatase inhibitors
- **B** Chemotherapy
- **C** Estrogen
- **D** Antitubercular therapy
- **E** Total abdominal hysterectomy

22 A 36-year-old woman has had menorrhagia and pelvic pain for six months. She had a normal, uncomplicated pregnancy 10 years ago but has failed to conceive since then. She has been sexually active with one partner for the past 20 years and has had no dyspareunia. On pelvic examination she has a symmetrically enlarged uterus, with no apparent nodularity or palpable mass. A serum pregnancy test result is negative. What is the most likely diagnosis?

- **A** Adenomyosis
- **B** Chronic endometritis
- **C** Endometrial hyperplasia
- **D** Endometriosis
- **E** Leiomyoma

23 A 32-year-old woman has cyclic abdominal pain that coincides with her menses. Attempts to become pregnant have failed over the past 5 years. There are no abnormal findings on physical examination. Laparoscopic examination shows numerous hemorrhagic 0.2- to 0.5-cm lesions over the peritoneal surfaces of the uterus and ovaries. Which of the following ovarian lesions is most likely to be associated with her findings?

- **A** Fibroma
- **B** Brenner tumor
- **C** Endometriotic cyst
- **D** Krukenberg tumor
- **E** Metastatic choriocarcinoma
- **F** Mucinous cystadenocarcinoma



24 A 49-year-old perimenopausal woman has had menometrorrhagia for the past 3 months. On physical examination, there are no remarkable findings. The microscopic appearance of an endometrial biopsy specimen is shown in the figure. The patient undergoes a dilation and curettage, and the bleeding stops, with no further problems. What condition is most likely to produce these findings?

- **A** Chronic endometritis
- **B** Ovarian mature cystic teratoma
- **C** Pregnancy with missed abortion
- **D** Repeated failure of ovulation
- **E** Use of oral contraceptives

25 A 52-year-old perimenopausal woman has had vaginal bleeding for a week. She has no medical problems and takes no medications. Hysteroscopy is performed and there is a single, 2-cm, smooth, soft mass protruding into the endometrial cavity. Biopsies are taken. What is microscopic examination of this lesion most likely to show?

A Endocervical glands with squamous metaplasia
B Endometrial glands resembling stratum basalis
C Papillae with marked cellular atypia
D Smooth muscle cells in bundles
E Tubular glands lined by clear cells with glycogen

26 A 42-year-old woman has had menometrorrhagia for the past 2 months. She has no history of prior irregular menstrual bleeding, and she has not yet reached menopause. On physical examination, there are no vaginal or cervical lesions, and the uterus appears normal in size, but there is a right adnexal mass. An abdominal ultrasound scan shows the presence of a 7-cm solid right adnexal mass. Endometrial biopsy shows hyperplastic endometrium, but no cellular atypia. What is the most likely lesion that underlies her menstrual abnormalities?

A Corpus luteum cyst
B Endometrioma
C Granulosa-theca cell tumor
D Mature cystic teratoma
E Metastasis
F Polycystic ovarian syndrome

27 A 62-year-old childless woman noticed a blood-tinged vaginal discharge twice during the past month. Her last menstrual period was 10 years ago. Bimanual pelvic examination shows that the uterus is normal in size, with no palpable adnexal masses. There are no cervical erosions or masses. Her body mass index is 33. Her medical history indicates that for the past 30 years she has had hypertension and type 2 diabetes mellitus. An endometrial biopsy specimen is most likely to show which of the following?

A Adenocarcinoma
B Choriocarcinoma
C Leiomyosarcoma
D Malignant müllerian mixed tumor
E Squamous cell carcinoma

28 A study of patients with postmenopausal uterine bleeding reveals that some of them have malignant neoplasms that arise from prior atypical hyperplastic lesions. The peak incidence is between 55 and 65 years of age in women who have obesity, hypertension, and/or diabetes mellitus. Molecular analysis reveals mutations of the *PTEN* tumor suppressor gene in most of them. Their malignancies tend to remain localized for years before spreading to local lymphatics. Which of the following neoplasms is most likely to have these characteristics?

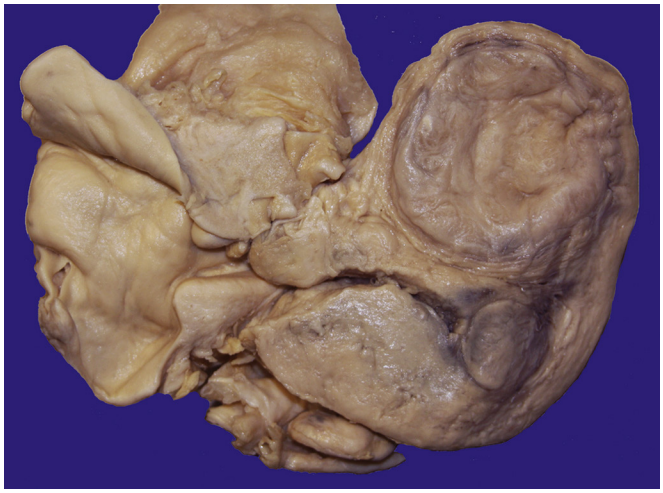
A Clear cell carcinoma
B Endometrioid carcinoma
C Leiomyosarcoma
D Müllerian mixed tumor
E Serous carcinoma
F Stromal sarcoma

29 A 62-year-old obese, nulliparous woman has an episode of vaginal bleeding, which produces only 5 mL of blood. On pelvic examination, there is no enlargement of the uterus, and the cervix appears normal. A Pap smear shows cells consistent with adenocarcinoma. Which of the following preexisting conditions is most likely to have contributed to the development of this malignancy?

A Adenomyosis
B Chronic endometritis
C Endometrial hyperplasia
D Human papillomavirus infection
E Use of oral contraceptives

30 A 40-year-old nulliparous woman has had menorrhagia for the past 6 months. On physical examination, her blood pressure is 154/93 mm Hg, there are no cervical lesions or adnexal masses, and the uterus is normal in size. She is 155 cm (5 feet 1 inch) tall and weighs 74.5 kg (body mass index 38). A Pap smear shows atypical glandular cells of uncertain significance. Hemoglobin A_{1c} concentration is 9.8%. Endometrial biopsy shows complex hyperplasia with atypia; molecular analysis detects loss of *PTEN* gene heterozygosity and enhanced AKT phosphorylation. Which of the following metabolic pathways is most likely to be activated in this tumor?

A Decreased glucose uptake
B Decreased prostaglandin synthesis
C Increased aerobic glycolysis
D Increased glycogen storage
E Increased oxidative phosphorylation



31 A healthy 59-year-old woman has had a feeling of pelvic heaviness for the past 11 months. There is no history of abnormal bleeding, and her last menstrual period was 8 years ago. Her physician palpates an enlarged nodular uterus on bimanual pelvic examination. A Pap smear shows no abnormalities. Pelvic CT scan shows multiple solid uterine masses; there is no evidence of necrosis or hemorrhage. A total abdominal hysterectomy is performed. Based on the gross appearance of the mass shown in the figure, what is the most likely diagnosis?

A Adenomyosis
B Endometriosis
C Leiomyomas
D Metastases
E Tuberculosis

32 A 53-year-old woman whose last menstrual period was 3 years ago notes vaginal bleeding for a week. On physical examination, her uterus is markedly enlarged, but there are no adnexal masses. CT imaging reveals an irregular 8-cm mass in the body of the uterus. A total abdominal hysterectomy is performed, and microscopic examination of the soft, hemorrhagic mass shows spindle cells with atypia and numerous mitoses. There is coagulative necrosis of tumor cells. Which of the following is the most likely cell of origin for this mass?

A Cytotrophoblastic cells
B Endometrial glandular cells
C Germ cells
D Smooth muscle cells
E Squamous epithelial cells

33 A 69-year-old woman has passed blood per vagina for a month. On pelvic examination no abnormal findings are noted. Which of the following diagnostic procedures should be performed next?

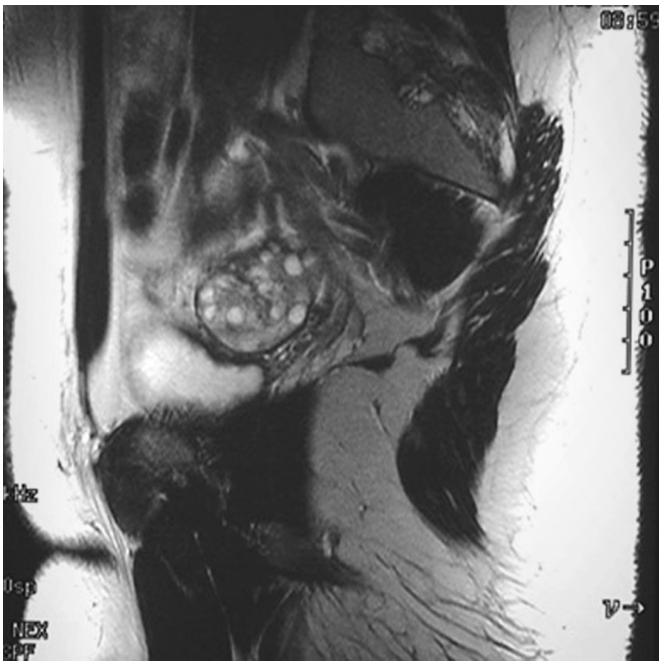
A Endometrial biopsy
B Magnetic resonance imaging
C Microbiologic culture
D Pap smear
E Pregnancy test

34 A 28-year-old woman has had fever, pelvic pain, and a feeling of pelvic heaviness for the past week. Pelvic examination shows a palpable painful left adnexal mass. Laparoscopy shows an indistinct left fallopian tube that is part of a 5-cm circumscribed, red-tan mass involving the left adnexal region. Which of the following infectious agents is most likely to produce these findings?

A *Chlamydia trachomatis*
B *Haemophilus ducreyi*
C Herpes simplex virus
D *Mycobacterium tuberculosis*
E *Treponema pallidum*

35 A 19-year-old woman has the sudden onset of abdominal pain. On physical examination, there is pelvic pain on palpation. Her stool is negative for occult blood. The serum and urine pregnancy tests are negative. Transvaginal ultrasound shows no intrauterine gestational sac, and uterus and adnexa are normal in size. Culdocentesis yields a small amount of blood-tinged fluid. Which of the following has most likely led to these findings?

A Ectopic pregnancy
B Endometriosis
C Follicle cyst
D Invasive mole
E Pelvic inflammatory disease



36 A 21-year-old woman experienced menarche at age 14 years and had regular menstrual cycles for the next 3 years. For the past year, she has had oligomenorrhea and has developed hirsutism. She has noticed a 10-kg weight gain in the past 4 months. On pelvic examination, there are no vaginal or cervical lesions, the uterus is normal in size, and the adnexa are prominent. A pelvic ultrasound scan shows that each ovary is twice normal size, whereas the uterus is normal in size. Magnetic resonance imaging is shown in the figure. Which of the following conditions is most likely to be present in this woman?

A Immature teratomas
B Krukenberg tumors
C Ovarian cystadenocarcinomas
D Polycystic ovarian syndrome
E Tubo-ovarian abscesses

37 A 35-year-old woman has had increasing abdominal enlargement for the past 6 months. She states that she feels like she is pregnant, but results of a pregnancy test are negative. On physical examination, there is abdominal distention with a fluid wave. A pelvic ultrasound scan shows bilateral cystic ovarian masses, 10 cm on the right and 7 cm on the left. The masses are surgically removed. On gross examination, the excised masses are unilocular cysts filled with clear fluid, and papillary projections extend into the central lumen of the cyst. Microscopic examination shows that the papillae are covered with atypical cuboidal cells that invade underlying stroma. Psammoma bodies are present. What is the most likely diagnosis?

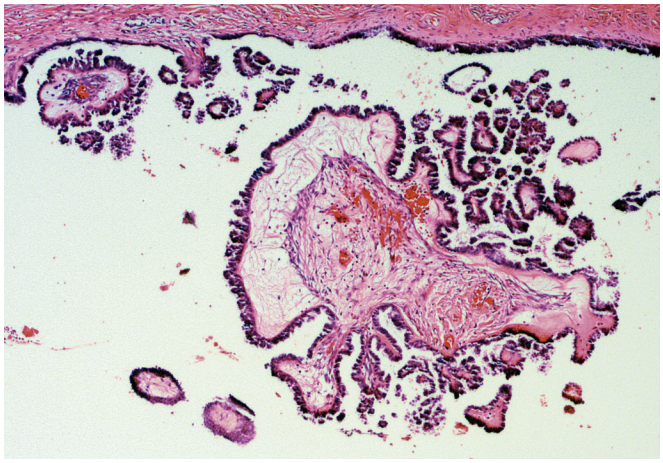
A Endometrioid tumor
B Cystadenocarcinoma
C Dysgerminoma
D Granulosa cell tumor
E Mature cystic teratoma
F Sertoli-Leydig cell tumor

38 A 40-year-old woman has noticed progressive enlargement of the abdomen over the past 5 months, although her diet has not changed, and she has been exercising more. Physical examination shows no palpable masses, but a fluid wave is present. Paracentesis yields 500 mL of slightly cloudy fluid. Cytologic examination of the fluid shows malignant cells. An abdominal ultrasound scan shows a 15-cm multilobular mass that involves the right adnexal region. The uterus is normal in size. The mass is surgically removed; the figure shows the gross features of a section of the excised mass. What is the most likely diagnosis?

- **A** Choriocarcinoma
- **B** Dysgerminoma
- **C** Granulosa cell tumor
- **D** Mucinous cystadenocarcinoma
- **E** Teratoma with malignant transformation

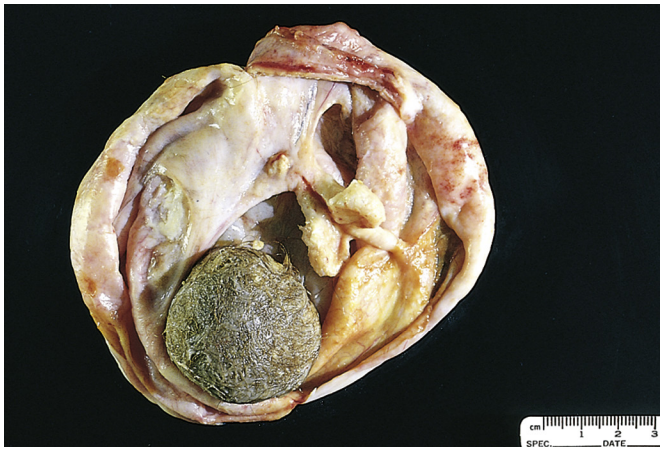
39 A 56-year-old woman has had weight loss accompanied by abdominal enlargement for the past 5 months. There is a family history of breast and ovarian carcinoma. On physical examination, there are no lesions of the cervix, and the uterus is normal in size, but there is a left adnexal mass. An abdominal ultrasound scan shows a 10-cm cystic mass in the left adnexal region, with scattered 1-cm peritoneal nodules, and ascites. Cytologic studies of peritoneal fluid show malignant cells. Which of the following mutated genes is most likely a factor in the development of this neoplasm?

- **A** *BRCA1*
- **B** *ERBB2* (*HER2*)
- **C** *MYC*
- **D** *KRAS*
- **E** *RB1*



40 A 42-year-old woman has noted dull lower abdominal pain for the past year. She reports no abnormal bleeding. On physical examination there is a large left adnexal mass. The pregnancy test is negative. Transvaginal ultrasound shows a right adnexal 10-cm cystic mass filled with fluid. The mass is removed and has the microscopic appearance shown in the figure. Which of the following is most likely to be associated with this lesion?

- **A** Brain metastases
- **B** Endometrial hyperplasia
- **C** Masculinization
- **D** Peritoneal implants
- **E** Sarcomatous transformation



41 A 33-year-old woman has had dull, constant abdominal pain for 6 months. On physical examination, the only finding is a right adnexal mass. CT scan of the pelvis shows a 7-cm circumscribed cystic mass on the right ovary, and it contains irregular calcifications. The right fallopian tube and ovary are surgically excised. The gross appearance of the ovary, which has been opened, is shown in the figure. Microscopic examination of this lesion is most likely to show which of the following?

- **A** Mature squamous epithelium
- **B** Papillary structures with psammoma bodies
- **C** Primitive neuroepithelium
- **D** Rhabdomyoblasts in a cellular stroma
- **E** Sheets of trophoblasts and syncytial cells

42 A 23-year-old woman has had pelvic discomfort for 4 months. On pelvic examination, there is a large, nontender, right adnexal mass. An abdominal CT scan shows the 11-cm mass to be solid and circumscribed. On surgical removal, the mass is solid and white, with small areas of necrosis. Microscopically, it contains mostly primitive mesenchymal cells along with some cartilage, muscle, and foci of neuroepithelial differentiation. What is the most likely diagnosis?

- **A** Brenner tumor
- **B** Dysgerminoma
- **C** Granulosa cell tumor
- **D** Immature teratoma
- **E** Leiomyosarcoma
- **F** Malignant müllerian mixed tumor

43 A 52-year-old woman has had dull pain in the lower abdomen for the past 6 months and minimal vaginal bleeding on three occasions. Her last menstrual period was 2 years ago. Pelvic examination shows a right adnexal mass, and the uterus appears normal in size. An abdominal ultrasound scan shows an 8-cm solid mass, a small amount of ascites, and a right pleural effusion. A total abdominal hysterectomy is performed, and the mass is determined to be an ovarian fibrothecoma. Which of the following additional lesions is most likely to be found in the excised specimen?

- **A** Bilateral chronic salpingitis
- **B** Cervical condylomata acuminata
- **C** Endometrial hyperplasia
- **D** Metastases to the uterine serosa
- **E** Partial mole of the uterus

44 A clinical study of women diagnosed with ovarian neoplasms reveals that 1 in 200 develop masculinizing signs and symptoms, including hirsutism, acne, breast atrophy, and amenorrhea. These women are found to have well-circumscribed, lobulated, firm, yellow mass lesions averaging 5 cm. Microscopically they have plump pink cells that show positive immunohistochemical staining for inhibin. Which of the following neoplasms are most likely to have these features?

- **A** Brenner tumor
- **B** Dysgerminoma
- **C** Endometrioid carcinoma
- **D** Granulosa-theca cell tumor
- **E** Sertoli-Leydig cell tumor

45 A 17-year-old girl missed a menstrual period, and her pregnancy test is positive. A month later, she notes suprapubic pain and passing blood clots from her vagina. She passes a small amount of tissue 3 days later. Pathologic examination of this tissue shows products of conception. Which of the following is the most likely cause for her pregnancy loss?

- **A** Bifid uterus
- **B** Group B streptococcus infection
- **C** Polycystic ovarian syndrome
- **D** Preeclampsia
- **E** Smoking cigarettes
- **F** Fetal trisomy 16

46 A 36-year-old woman has had an uneventful pregnancy for the past 37 weeks. Over the past 12 hours, she has developed lower abdominal pain. On examination, there is suprapubic tenderness. Her temperature is 37.4° C. Pelvic examination reveals a purulent cervical discharge. The infant is delivered 12 hours later. Which of the following organisms is most likely responsible for her premature labor?

- **A** Group B streptococcus
- **B** Herpes simplex virus
- **C** Rubella virus
- **D** *Toxoplasma gondii*
- **E** *Treponema pallidum*

47 A 22-year-old woman experiences sudden onset of severe lower abdominal pain. Physical examination shows no masses, but there is severe tenderness in the right lower quadrant. A pelvic examination shows no lesions of the cervix or vagina. Bowel sounds are detected. An abdominal ultrasound scan shows a 4-cm focal enlargement of the proximal right fallopian tube. A dilation and curettage procedure shows only decidua from the endometrial cavity. Which of the following laboratory findings is most likely to be reported for this patient?

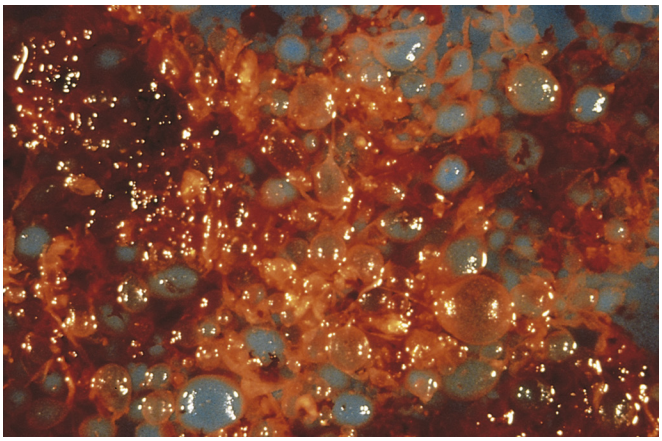
- **A** Cervical culture positive for *Neisseria gonorrhoeae*
- **B** Detection of human chorionic gonadotropin in serum
- **C** 69,XXY karyotype on decidual tissue cells
- **D** Pap smear showing pseudohyphae of *Candida*
- **E** Positive result of serologic testing for syphilis

48 A 36-year-old primigravida develops peripheral edema late in the second trimester. On physical examination, her blood pressure is 155/95 mm Hg. Urinalysis shows 2+ proteinuria, but no blood, glucose, or ketones. At 36 weeks, she gives birth to a normal viable but low-birth-weight infant. Her blood pressure returns to normal, and she no longer has proteinuria. Which of the following pathologic findings is most likely to be found on examination of the placenta?

- **A** Chorioamnionitis
- **B** Chronic villitis
- **C** Hydropic villi
- **D** Multiple infarcts
- **E** Partial mole

49 A 35-year-old primigravid woman at 30 weeks' gestation develops worsening headaches along with a 3-kg weight gain over 1 week. This morning she had a generalized seizure. On physical examination, she is afebrile, but her blood pressure is 190/115 mm Hg (it was 120/80 mm Hg at a prenatal visit 1 month ago). She has peripheral edema involving her head and all extremities. Fetal heart tones of 140/min and fetal movement are present. Laboratory studies show hemoglobin, 12.5 g/dL; hematocrit, 37.6%; MCV, 92 μm^3; platelet count, 199,000/mm^3; serum creatinine, 1 mg/dL; potassium, 4.2 mmol/L; and glucose, 101 mg/dL. Urinalysis shows 2+ proteinuria, but no hematuria, RBCs, WBCs, or casts. Which of the following is the most likely underlying factor in the causation of her disease?

- **A** Adrenal cortical hyperplasia
- **B** Disseminated intravascular coagulation
- **C** Gestational trophoblastic disease
- **D** Ovarian neoplasm producing estrogen
- **E** Placental ischemia
- **F** Uncontrolled gestational diabetes

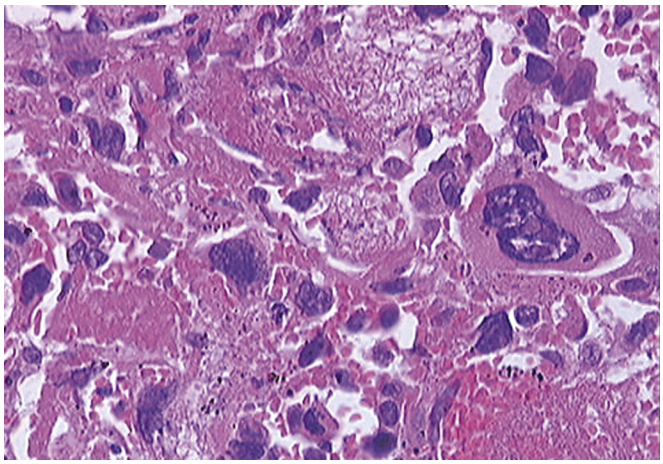


50 A 21-year-old G2, P1 woman is in the early second trimester. She has noted a small amount of vaginal bleeding for the past week and has had marked nausea and vomiting for 3 weeks. On physical examination, the uterus measures large for dates. An ultrasound examination shows intrauterine contents with a "snowstorm appearance," and no fetus is identified. The gross appearance of tissue obtained by dilation and curettage is shown in the figure. Which of the following substances is most likely to be greatly increased in her serum?

A Acetylcholinesterase
B α-Fetoprotein
C Estradiol
D Human chorionic gonadotropin
E Human placental lactogen

51 A 23-year-old woman, G3, P2, has a spontaneous abortion at 15 weeks' gestation. The male fetus is small for gestational age and is malformed, with syndactyly of the third and fourth digits of each hand. The placenta also is small, and shows 0.5-cm grapelike villi scattered among morphologically normal villi. Chromosomal analysis of placental tissue is most likely to show which of the following karyotypes?

A 45,X
B 46,XX
C 47,XXY
D 47,XY,+18
E 69,XXY



52 A 23-year-old woman suddenly notices a bloody, brownish vaginal discharge. The next day she has shortness of breath. On physical examination, a 3-cm, red-brown mass is seen on the lateral wall of the vagina. A chest radiograph shows numerous 2- to 5-cm nodules in both lungs. Laboratory studies show that her serum human chorionic gonadotropin levels are markedly elevated. A biopsy specimen of the vaginal mass is obtained and shown in the figure. Chromosome analysis of these cells shows a 46,XX karyotype. Which the following cells is most likely present in this mass lesion?

A Amnionic
B Rhabdomyoblast
C Serous epithelial
D Smooth muscle
E Syncytiotrophoblast

53 A 26-year-old woman delivered a normal neonate a month ago following an uncomplicated pregnancy. She now has vaginal bleeding. Hysteroscopy shows a nodule in the uterine fundus. Laboratory studies show hCG level of 200 mIU/mL. She is given chemotherapy but the lesion does not regress. Hysterectomy is performed. Microscopic examination of the nodule shows intermediate trophoblast cells. Immunostaining for which of the following proteins is most likely to yield positive results in this nodule?

A α-Fetoprotein
B Chromogranin
C Desmin
D Human placental lactogen
E Neuron-specific enolase

ANSWERS

1 B The inflammatory cells in the cervical discharge with redness (erythema), and the biopsy findings indicate that the patient has cervicitis. *Chlamydia trachomatis* is the most common cause of cervicitis in sexually active women. Candidiasis, gonorrhea, and trichomoniasis also are common. Candidiasis often produces a scant, white, curdlike vaginal discharge; gonorrhea may have an associated urethritis; and *Trichomonas* may produce a profuse homogeneous, frothy, and adherent yellow or green vaginal discharge. *Gardnerella* is found in bacterial vaginosis, a common condition caused by overgrowth of bacteria. *Gardnerella* infection produces a moderate, homogeneous, low-viscosity, adherent vaginal discharge that is white or gray and has a characteristic fishy odor; clue cells are seen on a wet mount. Herpetic infections are more likely to manifest as clear vesicles on the skin in the perineal region. Infection with human papillomavirus is associated with condylomata, dysplasias, and carcinoma.

PBD9 992–994 BP9 685 PBD8 1017 BP8 716–717

2 A The presence of the budding cells with pseudohyphae indicates a fungal infection with *Candida.* Candidal (monilial) vaginitis is common; this organism is present in about 5% to 10% of women. Recurrent episodes of vaginal candidiasis may be associated with non-albicans species. The inflammation tends to be superficial, and there is typically no invasion of underlying tissues. *Ureaplasma* is a bacterial agent, as is *Chlamydia,* and both can produce cervicitis. *Neisseria gonorrhoeae,* a gram-negative diplococcus, is the causative agent of gonorrhea. Infection with *Trichomonas vaginalis* can produce a purulent vaginal discharge, but the organisms are protozoa and do not produce hyphae.

PBD9 992–994 BP9 684 PBD8 1008–1009 BP8 712, 715–716

3 C Gonorrheal infections can lead to salpingitis and pelvic inflammatory disease with scarring of the fallopian tube. This predisposes to ectopic pregnancy, because the fertilized ovum has difficulty traversing the tube. Gonorrhea and other genital tract infections do not cause dysfunctional bleeding. Gonorrhea does not carry the risk of dysplasias or carcinomas that human papillomavirus infection does. Gonorrhea and other infections do not contribute to endometrial hyperplasia. The cause of endometriosis is not known with certainty, but infection does not seem to play a role in this process. Placenta previa results from low-lying implantation of the placenta and is not related to sexually transmitted diseases.

PBD9 994–995 BP9 685, 701 PBD8 1009–1010 BP8 715–717, 727–728

4 A Bartholin glands may become obstructed, inflamed, and cystic because of abscess formation, which then produces focal pain. A Gartner duct cyst may form in the lateral vaginal wall from the remnant of a wolffian (mesonephric) duct; the cyst is filled with fluid and is usually not inflamed. Hair follicles are not present at the inner labia. The Bartholin gland lies just inferior to the fascia of the urogenital diaphragm and just anterior to the vestibular bulb, which is not glandular and does not become cystic.

PBD9 996 BP9 682 PBD8 1011 BP8 712

5 C Lichen sclerosus et atrophicus is most common in postmenopausal women. Although this lesion is not premalignant, there is a 1% to 5% risk that women with this condition will later develop a squamous cell carcinoma. In contrast, lichen simplex chronicus appears grossly as leukoplakia from squamous hyperplasia and is not associated with malignancy. Extramammary Paget disease is rare; it produces reddish areas of scaling and is caused by the presence of adenocarcinoma-like cells at the dermal-epidermal junction. Human papillomavirus infection is associated with condylomata acuminata and with squamous epithelial dysplasias. Pelvic inflammatory disease results from infection of internal genital organs with organisms such as *Neisseria gonorrhoeae* and *Chlamydia trachomatis.* Vulvar intraepithelial neoplasia is marked by dysplastic squamous epithelial changes.

PBD9 996 BP9 682 PBD8 1011 BP8 712–713

6 D Squamous cell hyperplasia, formerly called *lichen simplex chronicus,* is most often seen in women aged 30 to 50. It is not premalignant, but it may coexist with lichen sclerosus, and leukoplakia suggests the possibility of a squamous cell carcinoma to be distinguished on biopsy. Human papillomavirus infection is associated with condylomata acuminata and with squamous epithelial dysplasias that show keratinocyte vacuolization and minimal inflammation. Contact dermatitis produces red patches and vesicles, with intense round cell infiltrates, and tends to diminish when the offending antigen (such as a skin cream) is not used. Psoriatic lesions have extensive scaling, and microscopically show focal thinning of the epidermis with marked parakeratosis. Vulvar intraepithelial neoplasia is marked by dysplastic squamous epithelial changes.

PBD9 996 BP9 682 PBD8 1011 BP8 712–713

7 D The epithelium shows typical features of infection with human papillomavirus (HPV)—specifically, prominent perinuclear vacuolization (koilocytosis) and angulation of nuclei. These lesions, called *condylomata acuminata,* may occur anywhere on the anogenital surface, as single lesions or, more commonly, as multiple lesions. They are not precancerous. Condylomata are associated with HPV infection, often types 6 and 11. Candidal infections produce a vaginitis or cervicitis with exudate and erythema. Chlamydial infections may produce urethritis, cervicitis, and pelvic inflammatory disease. *Haemophilus ducreyi* is the agent that produces the soft chancre of chancroid. *Treponema pallidum* is the infectious agent of syphilis, characterized by the gross appearance of a hard chancre.

PBD9 997 BP9 683 PBD8 1012 BP8 712–714

8 E Presence of dysplastic cells occupying half of the thickness of the epithelium suggests vulvar intraepithelial neoplasia (VIN). The incidence of these lesions has been increasing, probably because of more cases of human papillomavirus (HPV) infections. Some VIN lesions may progress to invasive cancers. Chronic inflammation alone does not produce dysplasia. A condyloma is usually a raised, nodular lesion. It also is caused by HPV, principally HPV-6 and HPV-11. Lichen sclerosus is a vulvar dystrophy characterized by thinning of the squamous epithelium and sclerosis of the dermis. Similar to VIN, squamous hyperplasia, another form of vulvar dystrophy, can appear as an area of leukoplakia, but no dysplastic changes are present.

PBD9 997–999 BP9 683 PBD8 1012–1014 BP8 714

9 B Extramammary Paget disease is a rare condition that is usually not associated with an underlying malignancy, in contrast to Paget disease of the breast. In many cases, the extramammary Paget cells remain in the epithelium, often for years, creating an annoying itchy red lesion. However, in a fourth of cases there may be an underlying neoplasm, so that local invasion and even metastases are possible. A condyloma is the result of human papillomavirus (HPV) infection and leads to koilocytotic atypia, but the cells of a condyloma are not malignant. Lichen sclerosis is a white patch of epithelial thinning with dermal fibrosis and chronic inflammation that can be extensive enough to constrict the vaginal orifice; it may have an autoimmune basis, and there is an increased risk for future development of a squamous carcinoma. Lichen simplex chronicus is an area of epithelial hyperplasia that has no atypia and no association with malignancy. Vulvar intraepithelial neoplasia has neoplastic cells extending the full thickness of the epithelium; it is related to HPV infection.

PBD9 999–1000 BP9 683–684 PBD8 1015 BP8 714–715

10 B The microscopic appearance is that of a malignant tumor containing cells with a clear cytoplasm. Vaginal clear cell carcinomas are associated with exposure of the patient's mother to diethylstilbestrol (DES) during pregnancy. These tumors are generally first diagnosed in the late teenage years. Congenital adrenal hyperplasia can produce masculinization in girls, manifesting in early childhood. Infection with human papillomavirus is associated with squamous epithelial dysplasias and malignancies, not with clear cell adenocarcinomas. Polycystic ovary disease can lead to hormonal imbalances from excess androgen production, but vaginal neoplasms do not arise in this setting. Trichomonal infections do not give rise to neoplasia.

PBD9 1000 BP9 685 PBD8 1016–1017 BP8 716

11 D Embryonal rhabdomyosarcoma is an uncommon vaginal tumor that can be found in girls younger than 5 years. Because it forms polypoid, grapelike masses, it is sometimes called *sarcoma botryoides.* Histologically, it is a small round blue cell tumor that shows skeletal muscle differentiation in the presence of muscle-specific proteins such as desmin. Neuroblastomas are childhood tumors and are also small blue cell tumors, but they occur in the adrenal glands or extra-adrenal sympathetic chain. Clear cell carcinomas of the vagina may be related to in utero exposure to maternal diethylstilbestrol (DES), but have an onset in the second or third decades of life. Invasive squamous cell carcinomas are rare in very young patients, and they show histologic evidence of squamous epithelial differentiation, and are related to human papillomavirus (HPV) infection. Vulvar intraepithelial neoplasia is a carcinoma in situ of the vulvar skin, squamous in origin, and related to HPV infection.

PBD9 1001 BP9 685 PBD8 1017 BP8 716

12 B Cervical intraepithelial neoplasia (CIN) I represents minimal (mild) dysplasia (low-grade squamous intraepithelial lesion, or LSIL) and is a potentially reversible process. Dysplasias are preneoplastic and may progress to carcinomas if not treated. Risk factors for cervical dysplasias and carcinoma include early age at first intercourse, multiple sexual partners, and a male partner with multiple previous sexual partners. These factors all increase the potential for infection with human papillomavirus. Diethylstilbestrol (DES) exposure is a factor in the development of clear cell carcinomas of the vagina and cervix. Use of oral contraceptives, which contain very low amounts of hormonally active compounds, does not cause cervical dysplasia or carcinoma. Treatment of cancers does not typically result in dysplasias, although the atypical changes in epithelial cells from radiation and/or chemotherapy may be challenging to distinguish from cancer. A vitamin B_{12} deficiency may produce some megaloblastic epithelial changes, but not dysplasia.

PBD9 1002–1004 BP9 685–688 PBD8 1020–1021 BP8 717–719

13 E The figure shows a high-grade squamous intraepithelial lesion (HSIL) termed *cervical intraepithelial neoplasia* (CIN) III because the dysplasia involves the full thickness of the cervical epithelium. Such lesions arise more frequently in women who have had first intercourse at an early age, have multiple sexual partners, or have a male partner with multiple sexual partners. These factors are believed to increase the risk of infection with human papillomavirus (HPV), particularly types 16 and 18, which have high risk for dysplasias and carcinomas of the cervix. Because of the causal relationship with HPV infection, the use of HPV vaccines has been shown to prevent disease progression. Cervical squamous neoplasia has not been shown to be associated with smoking, diet, body weight, or hormonal influences.

PBD9 1002–1004 BP9 685–687 PBD8 1019–1021 BP8 718–719

14 E This patient's cervical intraepithelial neoplasia (CIN) II is a high-grade squamous intraepithelial lesion (HSIL) that may progress to invasive carcinoma in several years if not treated, particularly because she has a high-risk subtype of HPV. Infection with HPV often drives this process, but the presence of HPV alone does not determine therapy. HPV infection cannot be eradicated with antibiotics, but patients may clear the virus. Chronic cervicitis with squamous metaplasia is not a malignant lesion and does not determine

therapy in this case. The conization can preserve fertility in women who are of childbearing age.

PBD9 1002–1004 BP9 686–688 PBD8 1020–1021 BP8 718–719

15 E Dysplasias of the cervix should not be ignored because they naturally progress to more severe dysplasias and to invasive carcinomas. Although not all cases progress, the physician should not take this chance. Dysplasias are strongly related to human papillomavirus (HPV) infections, and HPV DNA can be found in up to 90% of cases. Viral E6 and E7 proteins bind to Rb to up-regulate cyclin E. In about 10% to 15% of cases, there is no evidence of HPV, and other factors may play a role in the development of the dysplasia. With such HPV infection, the Pap smear may show changes of cervical intraepithelial carcinoma (CIN) I (low-grade squamous intraepithelial lesion, or LSIL). Oral contraceptives with low-dose estrogens and progestins do not increase the risk of dysplasia significantly. Though the *RB1* gene is involved, this is not an inherited problem, and retinoblastomas are not seen with HPV infection. Cervicitis usually is due to bacterial or fungal organisms and is not a significant risk for dysplasia or carcinoma. Antiapoptosis genes such as *BCL2* do not play a role in cervical carcinogenesis.

PBD9 1002–1004 BP9 685–688 PBD8 1018–1019 BP8 717–719

16 C Microinvasive squamous cell carcinomas of the cervix are stage I lesions that have a survival rate similar to that of in situ lesions. Such minimal invasiveness does not warrant more aggressive therapies. The likelihood of metastasis or recurrence is minimal.

PBD9 1004–1006 BP9 686–688 PBD8 1022–1023 BP8 719–720

17 F The cervical lesion shown in the figure is large and ulcerative and projects into the vagina. It is most likely an invasive squamous cell carcinoma that has infiltrated the subepithelial region. Dysplastic changes confined to the epithelium represent cervical intraepithelial neoplasia and do not form mass lesions. Glandular invasive lesions indicate an adenocarcinoma, which is much less common than squamous cell carcinoma of the cervix. Chronic cervicitis has erythema, but no mass effect. Clear cell carcinomas are uncommon and most likely found arising in the vagina. Extramammary Paget disease usually arises on the vulva, producing an eczematous lesion, not a mass, because the neoplastic cells are confined to the epithelium and to adjacent skin adnexa.

PBD9 1004–1006 BP9 684 PBD8 1021–1023 BP8 719–721

18 F This woman has several risk factors for the development of cervical squamous cell carcinoma, including multiple sexual partners, documented infection of the cervix with high-risk human papillomavirus (HPV) type 16, and diagnosis of a high-grade squamous intraepithelial lesion (HSIL). The remaining choices are not related to HPV infection. Clear cell carcinomas of the cervix are uncommon; some are associated with maternal use of diethylstilbestrol (DES) in pregnancy. An immature teratoma arises in the ovary. A Krukenberg tumor is a form of metastasis to the ovary. Leiomyosarcomas are rare and typically arise in the myometrium, although they can occur in the cervix. Sarcoma botryoides is a vaginal lesion that typically occurs in young girls.

PBD9 1002–1003, 1006–1007 BP9 685–688 PBD8 1018 BP8 719–721

19 A Anovulatory cycles are a common cause of dysfunctional uterine bleeding in young women who are beginning menstruation and in women approaching menopause. There is prolonged estrogenic stimulation that is not followed by secretion of progesterone. An ectopic pregnancy has acute findings and does not have a prolonged course. Endometrial carcinomas are rare in patients this age. Polyps are more common in older women. Submucosal leiomyomas are a cause of less variable bleeding and are more likely to be seen in older women.

PBD9 1007–1010 BP9 690–691 PBD8 1026–1027 BP8 723

20 B Acute endometritis in this case is the result of retained products of conception after delivery. Endometritis may also follow premature rupture of membranes with ascending infection to the uterine cavity. There is often polymicrobial infection with organisms found in the vagina. Some cases of chronic endometritis may be associated with *Neisseria* and *Chlamydia* infections and produce lymphoplasmacytic infiltrates within the endometrium. Cervical dysplasias are confined to the epithelium and are usually asymptomatic so that detection is by Pap smear. A myometrial neoplasm is unlikely to produce acute inflammation. An ovarian endometrioma is a mass lesion resulting from continued hemorrhage into a focus of endometriosis; but this mass lesion is not associated with pregnancy, and endometriosis may be a cause for infertility. *Mycobacterium tuberculosis* infection may spread to the female genital tract, most often the fallopian tube, but acute signs are unlikely to be present, and inflammation of the tube can be a cause for infertility. Vaginitis may produce acute inflammation with discharge, but trichomonal infections typically are associated with a watery gray-to-green discharge.

PBD9 1010 BP9 689 PBD8 1027 BP8 721

21 A In 30% to 40% of cases, endometriosis presents with infertility, menstrual irregularities, and pelvic pain. The presence of endometrial tissue in the nodules confirms this diagnosis. The glands in the nodules are hyperplastic but show no evidence of malignancy; in addition, all the genes implicated in endometrial cancer are normal. Hypomethylation of the two genes, *NR5A1 (steroidogenic factor 1)* and *ESR2 (estrogen receptor beta)* is found in endometriosis. These lead to overproduction of prostaglandins and estrogens. Aromatase inhibitors are used to suppress estrogen production. Lesions of endometriosis are not neoplastic and chemotherapy or major surgery with organ removal is not indicated. Endometriosis is not infectious, so antibiotics are not indicated.

PBD9 1010–1012 BP9 689–690 PBD8 1028–1029 BP8 722

22 A In adenomyosis, endometrial glands extend from the endometrium down into the myometrium. The process may

be superficial, but occasionally it is extensive, and the uterus becomes enlarged two to four times its normal size because of a reactive thickening of the myometrium. Chronic endometritis does not extend to the myometrium and does not increase uterine size. Endometrial hyperplasias do not increase the size of the uterus because the process is limited to the endometrium. In endometriosis, endometrial glands and stroma are found outside the uterus in such sites as peritoneum, ovaries, and ligaments. A leiomyoma is a myometrial tumor mass that, if large, produces an asymmetric uterine mass.

PBD9 1010–1012 BP9 689–690 PBD8 1028–1029 BP8 721

23 C Endometriosis is a condition in which functional endometrial glands are found outside the uterus. Common sites include ovaries, uterine ligaments, rectovaginal septum, and pelvic peritoneum. These endometrial glands can respond to ovarian hormones so that cyclic abdominal pain coincides with menstruation. Recurrent hemorrhages may incite scarring and the formation of fibrous adhesions in the pelvic region. This may cause distortion of the ovaries and fallopian tubes and may lead to infertility. One common variation is formation of an endometrioma, or chocolate cyst, which represents a focus of endometriosis that becomes an expanding cystic lesion as its center becomes filled with chocolate-brown sludge from the recurrent hemorrhage. The remaining choices are not associated with endometriosis, although endometrioid tumors may form in foci of endometriosis.

PBD9 1010–1012 BP9 689–690 PBD8 1028–1029 BP8 722–723

24 D Endometrial hyperplasia with numerous crowded glands as shown in the figure results from excessive estrogenic stimulation. This lesion often occurs with failure of ovulation about the time of menopause. Hyperplasias do not develop from endometritis. Estrogen-secreting ovarian tumors also may produce endometrial hyperplasia, but teratomas are not known for this phenomenon. A secretory pattern of the endometrium is seen in pregnancy, not the proliferative pattern shown in the figure. Oral contraceptives contain small doses of estrogenic compounds that do not lead to hyperplasia.

PBD9 1012–1013 BP9 691–692 PBD8 1030–1031 BP8 723–724

25 B She has an endometrial polyp, seen most often in perimenopausal and postmenopausal women. The lesion can lead to abnormal bleeding, but rarely gives rise to a malignancy. Endocervical glands with squamous metaplasia are seen most often with chronic cervicitis. Papillae with marked cellular atypia are seen with the serous type of endometrial carcinoma. Smooth muscle cells in bundles characterize a leiomyoma, which may be submucosal. Tubular glands lined by clear cells with glycogen are seen with the rare clear cell carcinoma.

PBD9 1012 BP9 693 PBD8 1029–1030 BP8 724

26 C The mass is probably producing estrogen, which has led to endometrial hyperplasia. Estrogen-producing tumors of the ovary are typically sex cord tumors, such as a granulosa-theca cell tumor or a thecoma-fibroma, the former more often being functional. Teratomas can contain various histologic elements, but not estrogen-producing tissues. Endometriosis can give rise to an adnexal mass called an *endometrioma,* which enlarges over time. Endometrial glands are hormonally sensitive, but they do not produce hormones. Corpus luteum cysts are common, but they are unlikely to produce estrogens. Metastases to the ovary do not cause increased estrogen production. Polycystic ovarian syndrome would involve both ovaries.

PBD9 1012–1013 BP9 691–692 PBD8 1050–1051 BP8 723, 732

27 A Postmenopausal vaginal bleeding is a red flag for endometrial carcinoma. Such carcinomas often arise in the setting of endometrial hyperplasia. Increased estrogenic stimulation is thought to drive this process, and risk factors include obesity, type 2 diabetes mellitus, hypertension, and infertility. Choriocarcinomas are gestational in origin. A submucosal leiomyosarcoma could produce vaginal bleeding, but the uterus would be enlarged because leiomyosarcomas tend to be large masses. Malignant müllerian mixed tumors are much less common than endometrial carcinomas, but they could produce similar findings. Malignant müllerian mixed tumors are typically uterine neoplasms that have glandular and stromal elements; the malignant stromal component can be heterologous and may resemble mesenchymal cells that are not ordinarily found in the myometrium, such as cartilage. Squamous carcinomas of the endometrium are rare, and more likely to arise in the cervix.

PBD9 1014–1018 BP9 692–693 PBD8 1031–1034 BP8 725–727

28 B Most endometrial cancers have the endometrioid pattern and are classified as type I endometrial carcinomas. They arise in the setting of unopposed estrogen stimulation and may also have *PTEN* mutations as well as microsatellite instability. In contrast, type II endometrial carcinomas occur at an older age in the background of atrophic endometrium; they usually have a serous carcinoma pattern, but may also exhibit clear cell and müllerian mixed patterns, and *TP53* mutations are common. Leiomyosarcomas and stromal sarcomas are far less common than endometrial carcinomas, and they have no known risk factors.

PBD9 1016–1018 BP9 692–693 PBD8 1031–1034 BP8 726

29 C Endometrial carcinomas can be associated with estrogenic stimulation from anovulatory cycles, nulliparity, obesity, and exogenous estrogens (in higher amounts than found in birth control pills). These risks may initially give rise to endometrial hyperplasia that can progress to endometrial carcinoma if the estrogenic stimulation continues. Atypical endometrial hyperplasias progress to endometrial cancer in about 25% of cases. Adenomyosis increases the size of the uterus and is not a risk for endometrial carcinoma. Chronic endometritis and human papillomavirus infection (associated with squamous epithelial dysplasias and neoplasia) do not cause cancer.

PBD9 1014–1016 BP9 692–693 PBD8 1031–1034 BP8 725–727

30 C She has obesity, diabetes mellitus, and nulliparity—factors that contribute to development of endometrial hyperplasias and carcinomas caused by hyperestrinism. She has complex endometrial hyperplasia with atypicality of cells, which is a precursor for type I endometrial carcinoma. These lesions often have loss of *PTEN* tumor suppressor genes. In many if not all cancers, there is activation of aerobic glycolysis (i.e., glycolysis even in the presence of enough oxygen)—the so-called Warburg effect. This is linked to loss of *PTEN* and offers a growth advantage to tumor cells. When aerobic glycolysis is stimulated there is a reciprocal decrease in oxidative phosphorylation. Tumors are metabolically active, so glucose uptake and glycogen utilization is enhanced and not reduced. This uptake is the basis for positron emission tomography (PET) scans, where positron-emitting fludeoxyglucose F 18 is preferentially taken up into foci of malignancy. In many cancers the COX-2 enzyme is up-regulated (e.g., colon cancer), and this leads to increased prostaglandins, but this is not related to *PTEN* loss.

PBD9 1013–1015 BP9 692–693 PBD8 1031–1032 BP8 725–727

31 C The masses shown are well circumscribed, suggesting the presence of multiple benign tumors. Leiomyomas (fibroids) can be present in one third to one half of all women. They tend to enlarge during the reproductive years, and then stop growing or involute after menopause. Although leiomyomas are often asymptomatic, leiomyomas that are submucosal may produce menometrorrhagia and chronic blood loss, leading to iron deficiency anemia. About 10% of complete moles are complicated by invasive mole, which is unlikely to produce a large, circumscribed mass. A leiomyosarcoma arises de novo, not from a leiomyoma, and is usually a larger, more irregular mass composed of more pleomorphic spindle cells with many mitoses. Decreased ovarian function after menopause accelerates bone loss, which may be severe enough to be termed *osteoporosis,* but this process is not related to female genital tract neoplasia. Preeclampsia with hypertension and proteinuria is associated with abnormal decidual vascularization and placental ischemia.

PBD9 1019–1020 BP9 693–694 PBD8 1036–1037 BP8 724–725

32 D Leiomyosarcomas arising in the uterine corpus account for about 5% of all GYN malignancies, and is most often present in postmenopausal women. The cellular atypia, coagulative necrosis, and numerous mitoses distinguish this neoplasm from the much more common leiomyoma (which does not give rise to leiomyosarcoma), both derived from smooth muscle. Anaplastic cytotrophoblasts are seen with choriocarcinomas. Cross striations are seen with rhabdomyosarcomas. Adenocarcinomas arise from glandular epithelium. Germ cells give rise to ovarian tumors such as teratoma and dysgerminoma. Squamous carcinomas are much more common but arise in the cervical portion of the uterus.

PBD9 1020–1021 BP9 694 PBD8 1037–1038 BP8 724–725

33 A Causes for postmenopausal uterine bleeding include endometrial atrophy, carcinoma, hyperplasia, and polyps. An early potentially curable endometrial carcinoma should not be missed. Even if the MRI is normal, a biopsy is still indicated. Infections are uncommon at this age and unlikely to cause bleeding. A Pap smear is insensitive for detection of endometrial lesions. She is postmenopausal and neither pregnancy nor gestational trophoblastic disease is probable.

PBD9 1009, 1018 BP9 690–692 PBD8 1027, 1034 BP8 723, 726

34 A Sexually transmitted diseases are the most common cause of inflammation of the fallopian tube. When the incidence of gonorrhea caused by *Neisseria gonorrhoeae* decreases in a population, the proportion of cases of salpingitis caused by *Chlamydia* and *Mycoplasma* increases. The fallopian tube can become distended and adherent to the ovary and may form a tubo-ovarian abscess. These are features of pelvic inflammatory disease. *Haemophilus ducreyi* causes chancroid, which can produce erythematous papules of the external genitalia or vagina, but grossly visible lesions may not be present in women. Herpes simplex virus most often involves the external genitalia, but it may produce vaginal or cervical lesions; it is unlikely to advance farther. *Mycobacterium tuberculosis* is an uncommon cause of salpingitis. *Treponema pallidum* infection causes syphilis, which does not produce florid inflammation with mass effect, just a chancre.

PBD9 1021 BP9 695 PBD8 1008, 1038 BP8 727–728

35 C Follicle cysts and lutein cysts of the ovary are so common that they are virtually normal findings and incidentalomas in diagnostic studies. Though most of them are less than 2 cm and asymptomatic, occasionally they can be larger (4 to 5 cm) and even enlarge a little more in response to midcycle hormones, occasionally rupturing to produce pain and bleeding. The negative pregnancy test helps to eliminate intrauterine or ectopic pregnancy. Endometriosis tends to produce more chronic pain, and though there is hemorrhage in the lesions, it tends to be contained within the lesions. The pregnancy test would be positive with an invasive mole, with uterine enlargement from the mass of grapelike villi. Pelvic inflammatory disease tends to produce chronic pain, and there is unlikely to be bleeding.

PBD9 1022 BP9 695 PBD8 1039 BP8 728

36 D Polycystic ovarian syndrome (PCOS) is a disorder of unknown origin that is typically associated with oligomenorrhea, obesity, and hirsutism. The MR image shows an enlarged ovary with multiple round cysts of increased signal intensity. It is thought to be caused by abnormal regulation of androgen synthesis. Teratomas are mass lesions that can be bilateral, but usually are not symmetric, and aside from struma ovarii not known for hormonal abnormalities. Krukenberg tumors represent metastatic disease involving the ovaries, usually from a primary site in the gastrointestinal tract, and are rare among patients of this age. Cystadenocarcinoma can be bilateral; however, androgen production by ovarian tumors is except by the Sertoli-Leydig cell tumors. Abscesses are usually unilateral and do not account for the hormonal changes seen in this patient.

PBD9 1022 BP9 695–696 PBD8 1039–1040 BP8 728

37 B Cystadenocarcinomas are common ovarian tumors that are often bilateral. The serous type occurs more frequently than the mucinous type and is typically unilocular, whereas mucinous tumors are multilocular. Serous cystadenocarcinomas account for more than half of ovarian cancers. As the name indicates, they are cystic in appearance. They may be benign, borderline, or malignant. Benign tumors have a smooth cyst wall with small or absent papillary projections. Borderline tumors have increasing amounts of papillary projections. Endometrioid tumors resemble endometrial carcinomas and may arise in foci of endometriosis. Dysgerminomas are solid tumors of germ cell origin. Granulosa cell tumors can be solid and cystic and may produce estrogens. Mature cystic teratomas typically contain abundant hair and gooey sebaceous fluid within the cystic cavity; surrounding tissues are formed from various germ layers. Sertoli-Leydig cell tumors are rare, yellow-brown, solid masses; they may secrete androgens or estrogens.

PBD9 1023–1026 BP9 696–697 PBD8 1042–1044 BP8 730

38 D Mucinous tumors of the ovary are of epithelial origin, are less common than serous tumors, and tend to be multiloculated. The appearance of ascites suggests metastases, which is most common with surface epithelial neoplasms of the ovary. Choriocarcinomas rarely reach this size because they metastasize early; they are typically hemorrhagic. Granulosa cell tumors and dysgerminomas tend to be solid masses. Teratomas are germ cell tumors differentiating into three germ layers; malignant transformation is rare, and is usually an element of squamous cell carcinoma from the ectodermal component.

PBD9 1026–1027 BP9 697–698 PBD8 1044–1045 BP8 730–731

39 A Some familial cases of ovarian carcinoma (usually serous cystadenocarcinoma) are associated with the homozygous loss of the *BRCA1* gene. This tumor-suppressor gene also plays a role in the development of familial breast cancers. Familial syndromes account for less than 5% of all ovarian cancers, however. The *ERBB2* gene may be overexpressed in ovarian cancers; however, mutations of this gene do not give rise to familial tumors, and it is best known for an association with breast carcinomas. Mutations of the *RAS* and *MYC* oncogenes occur sporadically in many types of cancer. The *RB1* gene, a tumor suppressor, can be involved in familial malignancies, including retinoblastoma and osteosarcoma.

PBD9 1024–1025 BP9 697 PBD8 1042 BP8 729–730

40 D This is a borderline serous tumor of the ovary, and the figure shows a complex papillary projection into the cyst lumen. This is the most common serous ovarian tumor, and though most act in a benign fashion even when peritoneal implants are present, some tend to recur, particularly when *KRAS* or *BRAF* mutations are present, and the implants are invasive. Distant metastases are unlikely. Serous tumors do not have hormonal effects, either estrogenic to drive endometrial hyperplasia, or androgenic to drive masculinization. Ovarian carcinomas do not transform to sarcomas, and sarcomas at this site are rare.

PBD9 1023–1025 BP9 696–697 PBD8 1042–1043 BP8 729–730

41 A A cystic tumor with a mass of hair in the lumen is the typical appearance of a mature cystic teratoma. This tumor also is known as a *dermoid cyst* because it is cystic and filled with hair and sebum derived from well-differentiated ectodermal structures. Teratomas with mature tissue elements are benign tumors of germ cell origin, and they can contain various ectodermally, endodermally, and mesodermally derived tissues. Papillary structures with psammoma bodies would characterize a cystadenocarcinoma. Primitive neuroepithelium in a more solid and less cystic mass would be consistent with an immature teratoma. Sarcomas of the ovary are uncommon; a rhabdomyosarcoma element could be part of a uterine malignant mixed mullerian tumor. A choriocarcinoma with trophoblastic cells is usually gestational in origin and has a hemorrhagic appearance.

PBD9 1029–1030 BP9 698–700 PBD8 1047–1048 BP8 733

42 D Immature teratomas are not cystic like mature teratomas. Tissues derived from multiple germ cell layers are present, as in all teratomas, but at least one immature tissue element is present. Often that immature element is neuroectodermal tissue. The less differentiated and more numerous the neuroepithelial elements, the higher the grade and the worse the prognosis. Adjuvant chemotherapy and radiotherapy yield a high response rate. Brenner tumors of the ovary are uncommon solid tumors that contain epithelial nests resembling transitional cells of the urinary tract; most are benign. Dysgerminomas are the female equivalent of male testicular seminomas. Granulosa cell tumors have cells that resemble those in ovarian follicles and may secrete estrogens. Leiomyosarcomas are solid tumors of smooth muscle origin that are found most often in the myometrium. Malignant müllerian mixed tumors are typically uterine neoplasms that have glandular and stromal elements; the malignant stromal component can be heterologous and may resemble mesenchymal cells not ordinarily found in the myometrium, such as cartilage.

PBD9 1029–1030 BP9 700 PBD8 1048 BP8 733

43 C Fibromas and thecomas are sex cord–stromal tumors that may be hormonally active and secrete estrogens that can lead to endometrial hyperplasia or even carcinoma. Fibromas can be associated with Meigs syndrome (ovarian tumor with ascites and right pleural effusion). Most of these tumors also are benign and do not metastasize. In most cases, chronic salpingitis is related to sexually transmitted infections, such as gonorrhea. A condyloma acuminatum is related to infection with human papillomavirus and is more likely to occur in younger, sexually active women on external genitalia and perineum. A partial mole is an uncommon form of gestational trophoblastic disease with a triploid karyotype and occurs only in reproductive-age women.

PBD9 1033 BP9 699 PBD8 1050–1051 BP8 732

44 E The Sertoli cell group of ovarian neoplasms mimics testicular differentiation and may produce androgens. These neoplasms tend to be better differentiated and act in a more benign fashion. Brenner tumors are uncommon solid masses, usually act in a benign manner, and may be associated with endometrial hyperplasia, though they may not directly produce estrogenic hormones unless there are thecalike cells present. Dysgerminomas and endometrioid carcinomas tend not to produce hormonal effects. Granulosa-theca cell tumors are known for association with estrogenic effects.

PBD9 1033–1034 BP9 699 PBD8 1051–1052 BP8 732

45 F Spontaneous abortion (miscarriage) may occur in at least a third of pregnancies, and most occur in the first trimester. Fetal problems are the most likely cause for early losses, whereas maternal problems account for most late fetal losses. Half of early abortuses have a chromosomal abnormality, many of which are incompatible with prolonged survival, such as trisomy 16. If there is recurrent early pregnancy loss, a parental germline chromosomal anomaly may be suspected. Infections, uterine anomalies, masses such as leiomyomas, and toxemia are more likely to cause fetal loss later in pregnancy. Polycystic ovarian syndrome is more likely to be a cause for infertility. Maternal smoking is most likely to affect fetal weight, and less likely to cause early fetal loss.

PBD9 1035–1036 PBD8 1053

46 A Placental infections are most likely to ascend from the vagina, and they are not usually hematogenous. Preterm premature rupture of membranes may predispose to ascending infection, or it may be caused by prostaglandins released from acute inflammatory cells in the infection as suggested by the purulent exudate. Premature labor with delivery is likely to occur over the next 24 hours. Of the TORCH infections, the one most likely in this case is the *O*, including bacteria, such as group B streptococcus, whereas *Listeria monocytogenes* may produce more chronic inflammation.

PBD9 1036–1037 BP9 701 PBD8 1055 BP8 734

47 B Conditions predisposing to ectopic pregnancy include chronic salpingitis (which may be caused by gonorrhea, but a culture would be positive only with acute infection), intrauterine tumors, and endometriosis. In about half of cases, there is no identifiable cause. Gestational trophoblastic disease associated with a triploid karyotype with partial mole developing outside the uterus is rare. *Candida* produces cervicitis and vaginitis and is rarely invasive or extensive in immunocompetent patients. Syphilis is not likely to produce a tubal mass with acute symptoms (a gumma is a rare finding).

PBD9 1036 BP9 701 PBD8 1053–1054 BP8 734–735

48 D Toxemia of pregnancy in this case is best classified as preeclampsia, because she has hypertension, proteinuria, and edema, but no seizures. The placenta tends to be small because of reduced maternal blood flow and uteroplacental insufficiency; infarcts and retroplacental hemorrhages can occur. Microscopically, the decidual arterioles may show acute atherosis and fibrinoid necrosis. Chorioamnionitis is most often due to ascending bacterial infections and leads to, or follows, premature rupture of membranes. A chronic villitis is characteristic of a congenital infection such as cytomegalovirus. Placental hydrops often accompanies fetal hydrops in conditions such as infections and fetal anemias. In a partial mole, a fetus is present, but it is malformed and rarely live-born.

PBD9 1037–1039 BP9 703–704 PBD8 1055–1057 BP8 737–738

49 E Classic features of eclampsia are defined by hypertension, edema, and proteinuria, typically with onset in the third trimester. The addition of seizures defines eclampsia. Primigravid women are at greater risk. There is no evidence in this case that primary renal disease could cause her hypertension, and the onset was sudden. Although the precise cause of preeclampsia/eclampsia is unknown, placental ischemia is believed to be the underlying mechanism. This is associated with shallow placentation and incomplete conversion of decidual vessels into high-volume channels required to perfuse the placenta adequately. Untreated patients may go on to disseminated intravascular coagulation. Cushing syndrome with adrenal cortical hyperplasia could lead to hypertension with sodium retention, but she does not have hypokalemia or hyperglycemia. Gestational trophoblastic disease predisposes patients to preeclampsia, but hydatidiform mole is excluded by the presence of a fetus, and a partial mole would be unlikely to persist into the third trimester. Functional ovarian tumors, most commonly estrogen secreting, such as a granulosa cell tumor or thecoma, do not produce hypertension and proteinuria. Gestational diabetes may increase the risk for fetal loss, but in this case the glucose is normal.

PBD9 1037–1039 BP9 703–704 PBD8 1055–1057 BP8 737–738

50 D The figure shows a hydatidiform mole, or complete mole, with enlarged, grapelike villi that form the tumor mass in the endometrial cavity. These trophoblastic tumors secrete large amounts of human chorionic gonadotropin (hCG). Molar pregnancies result from abnormal fertilization, with only paternal chromosomes present. Neural tube defects can be distinguished from other fetal defects (e.g., abdominal wall defects) by use of the acetylcholinesterase test on amniotic fluid obtained by amniocentesis. If acetylcholinesterase and maternal serum α-fetoprotein are elevated, a neural tube defect is likely. If the acetylcholinesterase is not detectable, another fetal defect is suggested. α-Fetoprotein is a marker for some germ cell tumors that contain yolk sac elements. Estrogens can be elaborated by various ovarian stromal tumors, including thecomas and granulosa cell tumors. More ominously, a decrease in maternal serum estriol suggests incipient abortion. Human placental lactogen is produced in small quantities in the developing placenta, and serum levels typically are not measured.

PBD9 1039–1040 BP9 701–702 PBD8 1057–1059 BP8 735–736

51 E Partial hydatidiform mole develops from triploidy (69 chromosomes). In contrast to a complete mole with only

paternal chromosomes, in which no fetus is present, a partial mole has a fetus because maternal chromosomes are present. Survival of the triploid fetus to term is rare. A partial mole may contain some grapelike villi, or none. The fetus is usually malformed, often with 3,4 syndactyly. A 46,XX karyotype could be present in a complete mole or a normal female fetus. A fetus with Turner syndrome (monosomy X) has a 45,X karyotype. Most female fetuses with loss of an X chromosome undergo spontaneous abortion, but some survive. Klinefelter syndrome has a 47,XXY karyotype, and male infants are live-born, with no placental problems. A 47,XY,+18 karyotype of trisomy 18 is associated with multiple congenital malformations, but not with a partial mole.

PBD9 1040 BP9 702 PBD8 1058–1059 BP8 735–736

52 E Choriocarcinomas are aggressive, malignant trophoblastic tumors. Some of these tumors can arise without evidence of pregnancy. Metastases in the vaginal wall and lungs and a hemorrhagic appearance are characteristic. The large pleomorphic and hyperchromatic syncytiotrophoblastic cells produce human chorionic gonadotropin. Treatment with agents such as etoposide, methotrexate, actinomycin D, cyclophosphamide, and vincristine can often lead to remission and cure. Amnionic cells do not give rise to neoplasms. Rhabdomyoblasts are present in embryonal rhabdomyosarcomas of the vagina of young girls. Serous epithelium does not give rise to gestational trophoblastic disease. Smooth muscle cells give rise to leiomyomas, and rarely leiomyosarcomas, typically arising in the uterus.

PBD9 1041 BP9 703 PBD8 1059–1061 BP8 736–737

53 D This is a placental site trophoblastic tumor (PSTT), the rarest of all forms of gestational trophoblastic disease. The intermediate trophoblastic cells do not produce large amounts of hCG, but do produce human placental lactogen (hPL). Most of these lesions are treated surgically and are controlled, but some recur and respond minimally to chemotherapy and radiation. α-Fetoprotein is produced by some testicular neoplasms and by hepatocellular carcinomas. Chromogranin is a marker for neuroendocrine tumors. Desmin is likely to be seen in tumors of mesenchymal origin. Neuron-specific enolase can be seen with tumors of neural and neuroendocrine differentiation.

PBD9 1041–1042 BP9 703 PBD8 1061 BP8 737