Chapter 25

Lesions of Extravillous Trophoblast

General Considerations 459
Placental-Site Nodule 460
Exaggerated Placental Site 462
Placental-Site Trophoblastic Tumor 463
  Differential Diagnosis 467
Epithelioid Trophoblastic Tumor 469
Extrauterine Lesions of Extravillous Trophoblast 469
Selected References 472

General Considerations

Lesions of extravillous trophoblast (EVT) have been known for over 100 years. The first lesion that was described, "syncytial endometritis," is a nonneoplastic lesion that is merely an exuberant proliferation of the EVT in the implantation site. It was later renamed **exaggerated placental site**. Another lesion of EVT was described shortly thereafter, the "syncytioma." Other designations, such as chorioma, atypical chorionepithelioma, chorionepitheliosis, and trophoblastic pseudotumor, have also been used. It was first thought that it was also a benign, nonneoplastic proliferation of EVT, hence the designation of pseudotumor. Reports of lesions with aggressive behavior and metastasis, however, have led to its reclassification as a potentially malignant neoplasm. It is since been renamed **placental site trophoblastic tumor**. Much more recently, two additional lesions of EVT have been described: a benign nonneoplastic lesion called the **placental**

R.N. Baergen, *Manual of Pathology of the Human Placenta*,
DOI 10.1007/978-1-4419-7494-5_25, © Springer Science+Business Media, LLC 2011

site nodule, and a variant of placental site trophoblastic tumor, the **epithelioid trophoblastic tumor**.

Placental-Site Nodule

Clinical Features and Implications

The **placental-site nodule** (PSN) is a benign, nonneoplastic lesion thought to represent EVT retained in the uterus after pregnancy. PSNs occur primarily in reproductive-age patients, but may be seen in postmenopausal patients. They may follow a normal pregnancy, abortion, or mole, and may be diagnosed several weeks to many years after the preceding pregnancy. Many patients have a history previous gynecologic surgery such as cesarean section, therapeutic abortion, or curettage. In one study, a significant number of patients had a history of bilateral tubal ligation. One half of the patients present with *abnormal bleeding*, and in the remainder, the lesions are *incidental findings in curettage or hysterectomy specimens.* The lesions are often found in the lower uterine segment and cervix. Serum β-human chorionic gonadotropin (β-hCG) levels are not elevated. *Follow-up on patients with PSNs has been benign,* and progression to gynecologic malignancy or trophoblastic disease is generally thought not to occur. However, one recent report describes a lesion with features of both PSN and epithelioid trophoblastic tumor (see below) and the authors suggested that this indicated malignant transformation of a PSN. This has yet to be confirmed by other reports.

Pathologic Features and Pathogenesis

Placental-site nodules are usually *too small to be visible by gross inspection*. When they are visible, they consist of single or multiple, small, focally *hemorrhagic pale-tan nodules or plaques in the endometrium or the superficial myometrium measuring from 1 to 4 mm in diameter*. They are commonly located in the lower uterine segment or the cervix. Microscopically, PSNs consist of *well-circumscribed, rounded nodules or plaques with prominent hyalinization and fibrinoid deposition* (Fig. 25.1). They may have *central hyalinization with a more cellular peripheral zone of EVT* (Fig. 25.2). The cells are arranged singly or in clusters, and contain *eosinophilic or amphophilic cytoplasm that is often vacuolated and appears degenerative*. The cell borders are often indistinct, merging with the extracellular material. The *nuclei may be degenerative or smudgy* in appearance as well (Fig. 25.3). Occasionally they are pale and vesicular, lobulated, or infrequently, bizarre. *Mitotic activity is minimal or absent* and nodules stained immunohistochemically for Ki-67, show positivity in less than 5% of cells (Ki-67 labeling index). The nodule also may contain scattered chronic inflammatory cells and fibroblasts. In over one-half of the cases, small extensions or *"pseudopods" consisting of EVT admixed with eosinophilic, fibrinoid material extend into the surrounding tissue.* The fibrinoid material in particular is

similar to keratinization and may mimic invasive squamous carcinoma. The frequent location of PSNs in the cervix may thus be problematic. The adjacent endometrium is usually proliferative or secretory. PSNs are not associated with chorionic villi or elevation in serum β-hCG levels.

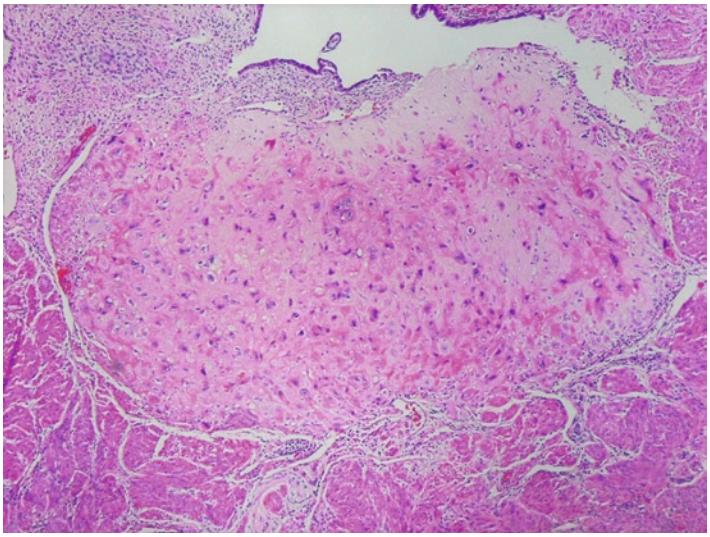

Figure 25.1. Incidental placental site nodule/plaque in a hysterectomy specimen. H&E ×40.

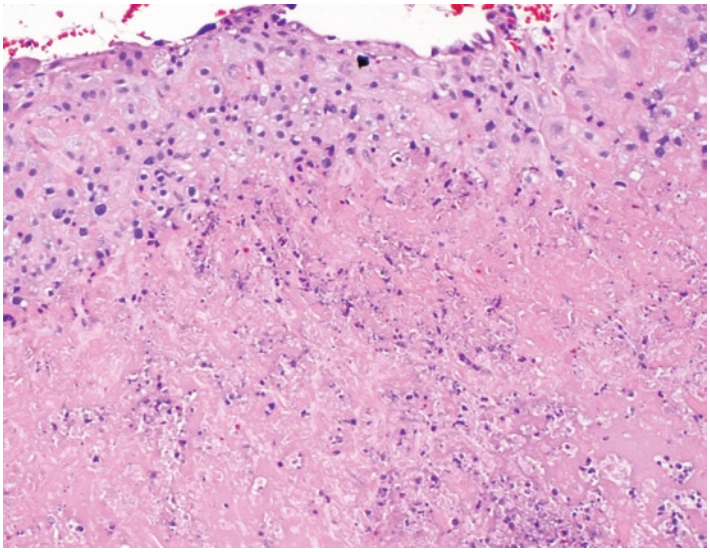

Figure 25.2. Placental site nodule showing hyalinization and degenerative change. Extravillous trophoblast is present in the *upper portion* of the figure. H&E ×200.

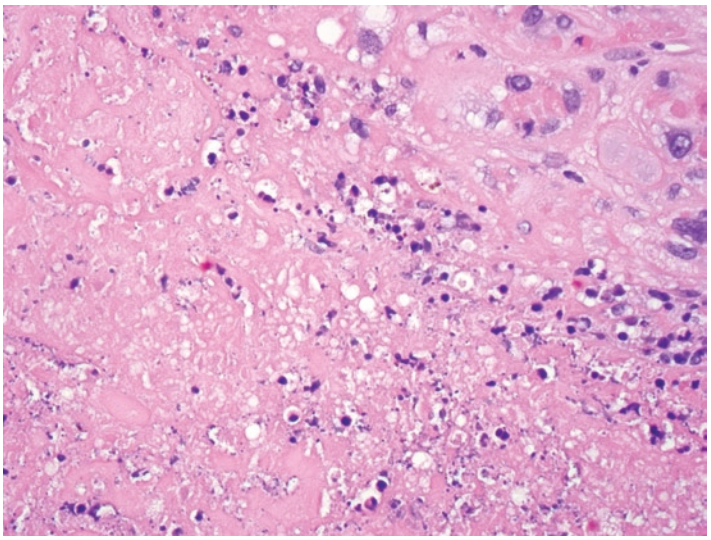

Figure 25.3. Placental site nodule with degenerated and vacuolated nuclei. H&E ×360.

Exaggerated Placental Site

Clinical Features and Implications

Exaggerated placental site (EPS) is a *nonneoplastic, albeit exuberant, proliferation of EVT in the implantation site, associated with pregnancy*. It occurs in 1.6% of first trimester abortion specimens and represents an *"excessive" physiologic response* of EVT. The original name of syncytial endometritis for lesion reflects the presence of many placental site giant cells in the implantation site.

Pathologic Features

Exaggerated placental site is *not identifiable on gross examination*. On microscopic examination, the architecture of the endometrial and myometrial tissue in the placental site is maintained. The trophoblastic cells *proliferate in and around the endometrial glands and smooth muscle fibers without destructive invasion* (Fig. 25.4). The extravillous trophoblastic cells have moderately abundant *eosinophilic or amphophilic cytoplasm and nuclei, which are sometimes irregular or hyperchromatic.* Occasional multinucleated cells are also present. *Mitotic activity is minimal or absent*, and the Ki-67 labeling index is low. Intermixed with the trophoblastic cells are variable numbers of smooth muscle cells, decidual cells, and inflammatory cells, and the *fibrinoid material* that is so characteristic of EVT. These lesions occur concomitant with pregnancy, and therefore *chorionic villi are almost always present.* Their presence is an important clue in diagnosis. The significance of this lesion lies primarily in its common association with complete hydatidiform moles and in its differentiation from other trophoblastic lesions. *Differentiation of EPS from a normal implantation site is rather arbitrary, as there are no specific criteria.* This is in part because "normal" placental sites are rarely sampled or

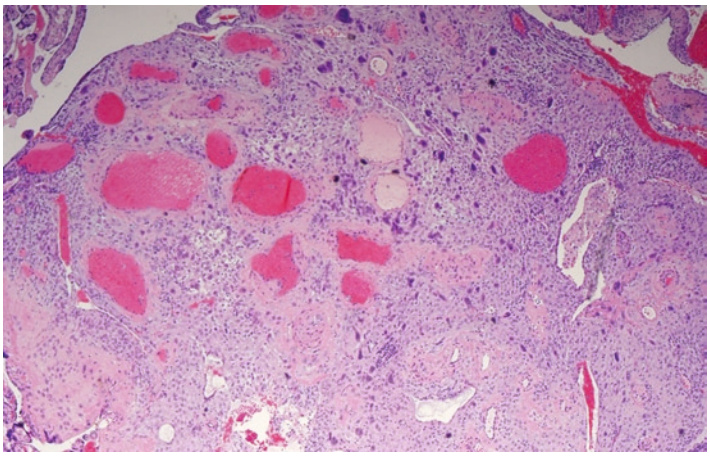

Figure 25.4. Exaggerated placental site. Note preservation of glandular architecture and the exuberant trophoblastic proliferation. Multinucleated trophoblast are also present. H&E ×20.

observed by pathologists. Diagnosis may be made when the proliferation of EVT is significantly more prominent than usual.

Placental-Site Trophoblastic Tumor

Clinical Features

Placental-site trophoblastic tumor (PSTT) is a rare gestational tumor deriving from EVT. Like other trophoblastic lesions, PSTTs occur predominantly in reproductive-age women and have been reported in patients as young as 18 and as old as 62 years of age. PSTTs may occur after abortions, term pregnancies, or moles. In contrast to choriocarcinoma in which 50% develop after a hydatidiform mole, only 5–8% of PSTTs develop after a molar pregnancy. The interval from the previous known pregnancy has been reported to be as little a several months to as long as 18 years.

Patients most commonly present with *abnormal uterine bleeding or amenorrhea*. In comparison to choriocarcinoma, in which virtually all patients have marked elevations in serum β-hCG levels, in PSTT, *β-hCG levels are only moderately elevated and only in 80% of patients*. The presence of *uterine enlargement, abnormal bleeding, and a positive pregnancy test* often leads to the presumptive diagnosis of pregnancy, missed abortion, or ectopic pregnancy. In rare cases, patients may present with abdominal pain, virilization, spider angiomata of the skin, infertility, galactorrhea, or renal failure.

Pathologic Features

Lesions arise primarily in the *myometrium and endomyometrium* but occasionally may involve, or extend to, the cervix. They vary in size from a *few millimeters to large, bulky masses measuring up to 10 cm in diameter.* Most commonly, they have ill-defined borders (Fig. 25.5), but

occasionally they may be grossly well circumscribed. On cut section, the tumor is generally *soft, tan-white to yellow. Focal hemorrhage and necrosis are sometimes identified;* however, the hemorrhage and necrosis are much less conspicuous than in choriocarcinoma. PSTTs are deeply invasive into the uterine wall in 60% of patients, and extension to the serosa may result in *uterine perforation* at presentation or curettage. Some tumors have extended through the uterine wall to involve the fallopian tube or broad ligament.

Microscopic examination typically reveals an *infiltrative mass* within the endomyometrium composed of *infiltrating sheets and cords of predominantly mononuclear EVT, which separate and split apart individual smooth muscle fibers* (Fig. 25.6). *The histologic appearance is quite variable*, both from tumor to tumor and within the same tumor. The tumor cells are predominantly *polygonal with moderately abundant dense amphophilic, eosinophilic, or clear cytoplasm* (Fig. 25.7). Tumor cells may also be *spindled,* and in some tumors, the majority of cells are spindled. A minority of the EVT may be binucleated or trinucleated, and contain nuclei similar to those within the mononuclear cells. Often scattered throughout

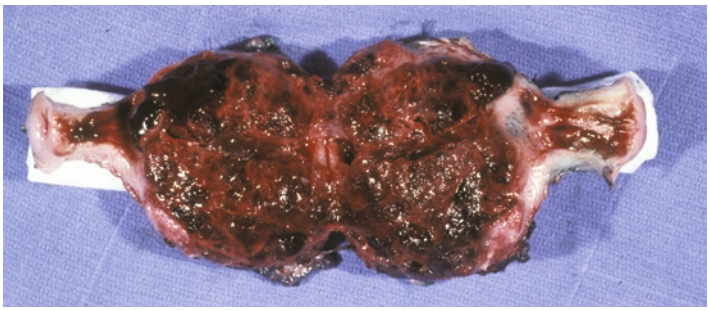

Figure 25.5. PSTT. An ill-defined, hemorrhagic, and necrotic tumor fills the endometrial cavity.

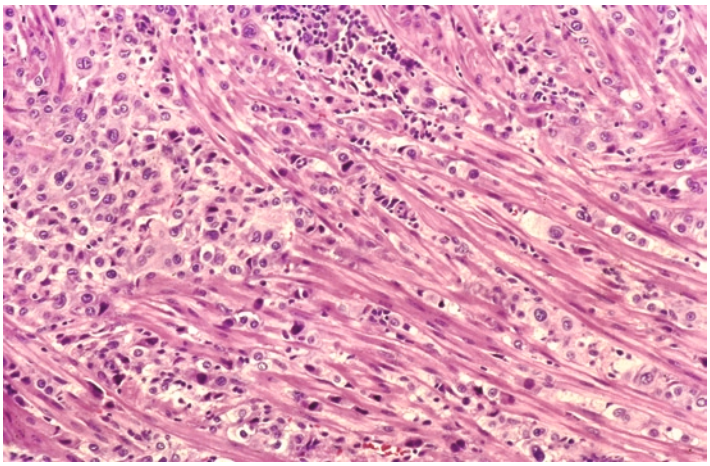

Figure 25.6. PSTT. Sheets of EVT proliferate between and split apart smooth muscle fibers. H&E ×200.

the tumor are multinucleated cells with irregular, hyperchromatic, or smudgy nuclei similar to syncytiotrophoblast; however, these are generally scarce. The cells may be relatively monomorphic (Fig. 25.8) or show marked nuclear pleomorphism and atypia (Fig. 25.9). Nuclear folding and intranuclear pseudoinclusions may also be seen. *Nucleoli, though, are usually small and indistinct,* but focally may be quite large and prominent. The mitotic rate ranges from less than 1 to more than 30 mitoses per 10 high-power field (hpf). Atypical mitotic figures are seen in up in 90% of cases.

Coagulative tumor cell necrosis, hemorrhage, and focal inflammation are seen in over two thirds of these tumors. One of the *most characteristic features is the presence of extracellular fibrinoid material* similar to that present in the normal implantation site. This feature is also present in over 90% of cases (Fig. 25.10). In approximately two thirds of cases,

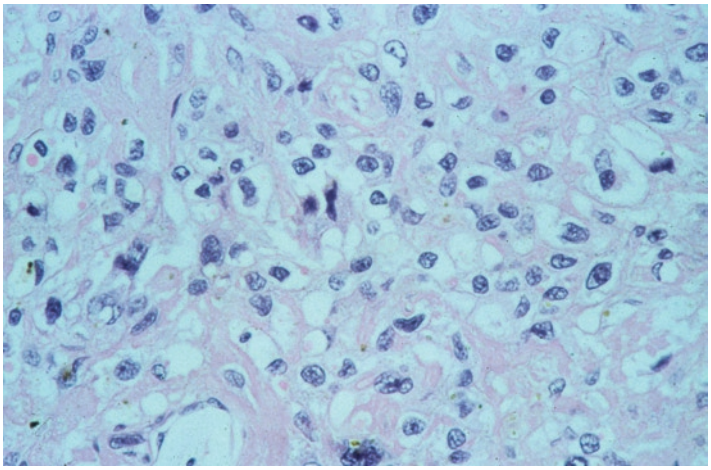

Figure 25.7. Variant of PSTT with clear cytoplasm. H&E ×300.

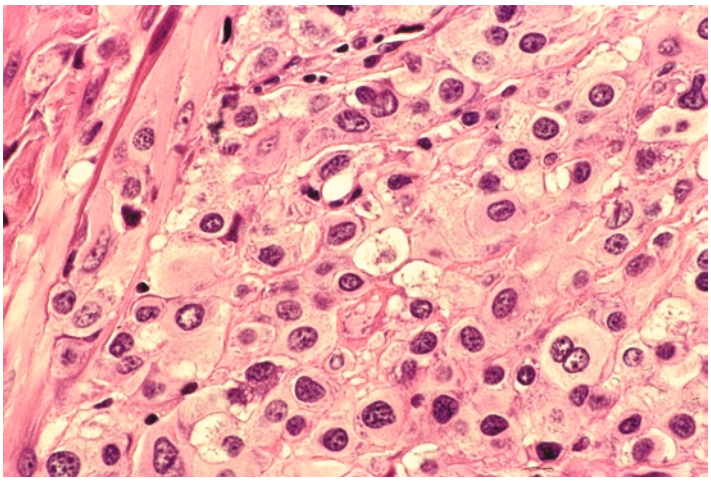

Figure 25.8. Relatively monomorphic population of EVT with minimal atypia in PSTT. H&E ×160.

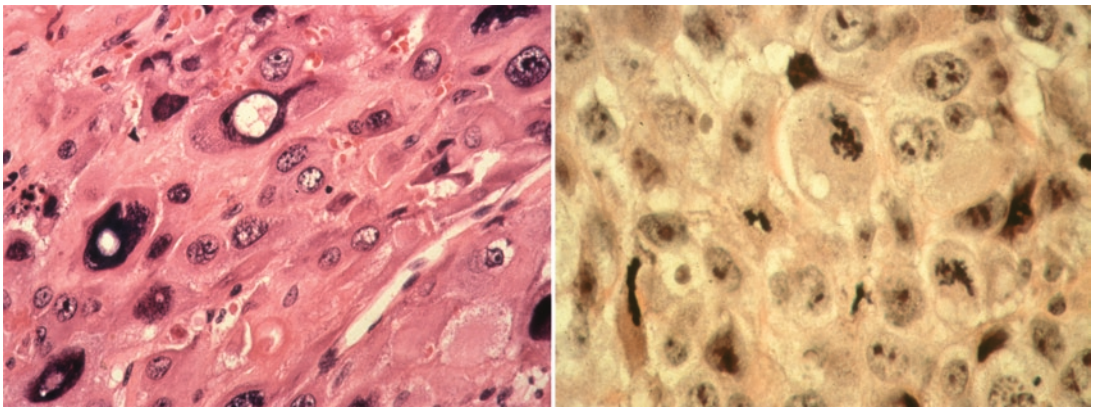

Figure 25.9. PSTT. Marked nuclear pleomorphism (*left*) is present in this tumor, which also shows with easily identifiable mitotic figures (*right*). H&E ×400.

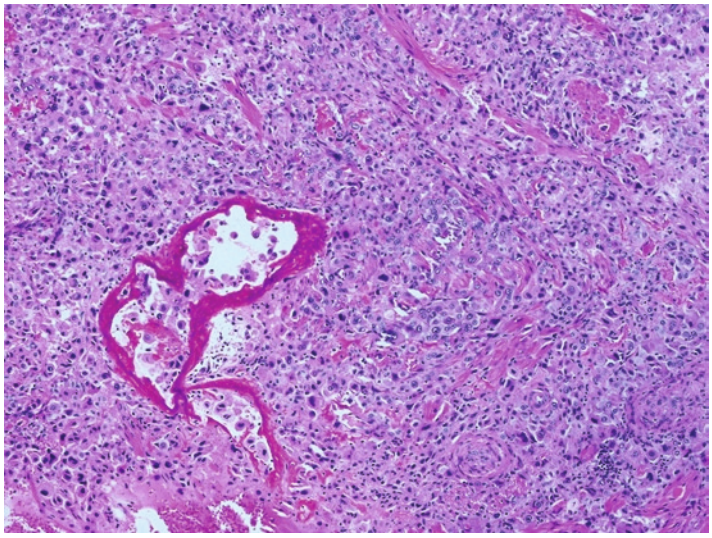

Figure 25.10 PSTT. Prominent fibrinoid deposition is present. H&E ×100.

there is a peculiar form of *vascular invasion* that recapitulates the normal implantation site in that there is replacement of the vascular wall by trophoblast and the presence of intraluminal trophoblast (Fig. 25.11). The uninvolved endometrium is usually decidualized or secretory, but occasionally is proliferative or inactive.

Clinical Implications

Most PSTTs behave in a benign manner. The remaining 10–15% of patients shows aggressive disease with metastasis and even death. Metastases have been reported in the *lungs, liver, vagina, gastrointestinal tract, pelvis, bladder, brain, ovary, omentum, diaphragm, spleen, pancreas, pelvic lymph nodes, and bone marrow.* Lung metastases are the most common. Metastasis to the brain is usually fatal due to intracranial hemorrhage. Late metastasis or recurrence has been reported 5 years after initial diagnosis. Prognosis is heavily dependent on Stage. Survival at 10 years is 90% in stage 1 tumors, 52% in stage II tumors, and 49% in stage III and IV tumors.

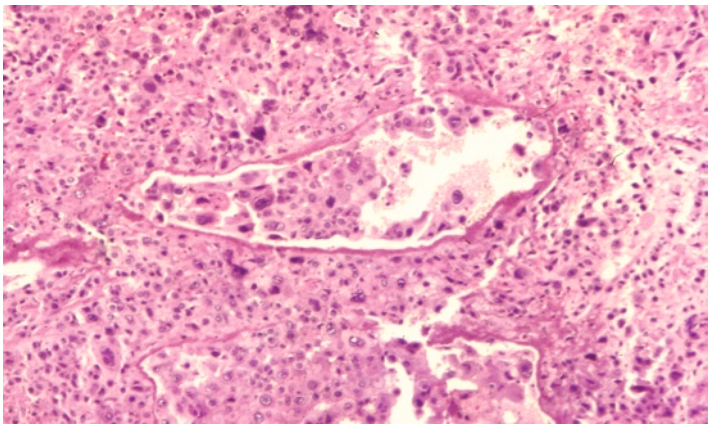

Figure 25.11. PSTT. Typical "vascular invasion." H&E ×200.

Unfortunately, at present there is no way of accurately predicting which tumors will behave in a malignant manner. Recent attempts to find clinical and histologic features that could serve as prognostic factors have generally been disappointing. This having been said, some features are more common in patients that develop distant metastases. The most important prognostic factor is the International Federation of Gynecology and Obstetrics (FIGO) trophoblastic staging. Histologic factors that have been associated with poor prognosis are *deep myometrial invasion, cervical involvement, increased mitotic activity, and clear cytoplasm.* Clinical factors associated with a poorer prognosis are *more advanced age at diagnosis, increased interval from preceding pregnancy, preceding term pregnancy, and high maximum serum levels of β-hCG.* Recently, occurrence of the tumor more than 48 months after preceding pregnancy was the most important prognostic factor other than stage. Caution must be used when predicting the behavior of individual tumors, as some tumors with low mitotic rates have metastasized and some with pelvic extension or metastasis have ultimately had an indolent or even benign course without treatment.

In most patients with disease confined to the uterus, e.g., stage I, the treatment of choice is *hysterectomy*. Conservative local excision has been advocated for some patients with limited disease. Unfortunately, patients with metastatic PSTT have not experienced the success seen in patients with choriocarcinoma who have been treated with chemotherapy. Some patients with advanced disease have been cured, but outcome is variable. Generally speaking, patients at higher stages are usually treated with combined surgery and multiagent chemotherapy. Patients may be followed for treatment response or to monitor the disease with serial serum β-hCG determinations because the levels fall to normal in remission and rise with disease recurrence or metastasis. This is not useful in all patients, as 20% of patients do not have an elevation in serum β-hCG.

Differential Diagnosis

Placental-site trophoblastic tumor must be distinguished from other lesions of EVT, from choriocarcinoma, and from nontrophoblastic

lesions, particularly poorly differentiated carcinomas. Clinical features that may be used in differentiating extravillous trophoblastic lesions are summarized in Table 25.1, pathologic features in Table 25.2, and immunohistochemical findings in Table 25.3.

Differential Diagnosis: PSTT Versus Lesions of EVT

Since PSN, EPS, and PSTT derive from EVT, differentiation between lesions may sometimes be difficult. PSTTs are infiltrative tumors with mitotic activity, hemorrhage, necrosis, and vascular invasion, and are quite cellular. PSNs, on the other hand, are well-circumscribed nodules with hyalinization and a degenerative appearance that can usually be recognized as benign lesions, despite the presence of irregular extensions into the adjacent tissue or pseudopods. Neither EPSs nor PSNs produce a mass lesion or grow in an infiltrative pattern. Neither PSTTs nor PSNs contain chorionic villi, a feature that usually distinguishes both from an EPS.

Immunohistochemical studies of PSN, EPS, and PSTT confirm origin from EVT, with positivity for epithelial markers such as cytokeratin and EMA, positivity for trophoblastic markers such as human placental lactogen (hPL), human chorionic gonadotropin (hCG), placental alkaline phosphatase (PLAP), Mel-CAM (CD146), and α-inhibin. PSNs show diffuse positivity for PLAP and P63 and only focal positivity for hPL and Mel-CAM, while PSTTs show the opposite pattern with diffuse positivity for hPL and Mel-CAM and only focal positivity for PLAP and hCG, and negativity for P63. This is similar to the staining pattern of *EVT in the chorion laeve, and it has been suggested that PSNs derive from those cells.* The difference in immunohistochemical profiles is summarized in Table 25.3. Ki-67 is also useful as PSN has a labeling index of <5%, while PSTT may have a labeling index of up to 14%.

Clinical information may be essential in the differentiation of these lesions. PSTT usually presents clinically as a mass, so information gained from physical examination or various types of imaging studies may be very helpful in adjudicating difficult cases. Patients with PSN do not have elevations in serum β-hCG, while those with EPS will have elevations consistent with an intrauterine pregnancy. Since 80% of patients with PSTT have elevations, this may help distinguish these lesions. *When it is difficult to distinguish PSTT from a PSN, serum β-hCG levels should be requested.*

Differential Diagnosis: PSTT Versus Choriocarcinoma

The main difference between *choriocarcinoma and PSTT is that the former consists almost exclusively of villous trophoblast while the latter consists almost exclusively of extravillous trophoblast.* Although rare "monophasic" variants of choriocarcinoma have been described, choriocarcinoma typically consists of cytotrophoblast and syncytiotrophoblast with a typical biphasic pattern, as opposed to the monophasic proliferation of the EVT seen in PSTT.

Immunohistochemistry is helpful in differentiating EVT from villous trophoblast, as PSTTs will be positive for markers of EVT, while mononuclear cytotrophoblast is generally negative for those markers and hCG. Syncytiotrophoblast is not difficult to distinguish from EVT due to its multinucleation, the presence of atypical hyperchromatic nuclei, and strong immunoreactivity for hCG. However, occasional

multinucleated syncytial cells may be seen in PSTT that stain positive for hCG. In addition, rare trophoblastic tumors have been described that have features of both PSTT and choriocarcinoma. These may represent tumors of stem cell trophoblast that have divergent differentiation.

Differentiation of PSTT from Other Tumors

Often, the infiltrative and malignant nature of PSTT is obvious, but its origin remains obscure. It may be misinterpreted as a type of poorly differentiated carcinoma or even a sarcoma. *The fibrinoid produced by EVT often suggests keratin, and as a result PSTT may be confused with squamous cell carcinoma.* This is particularly problematic when the tumor is present in the cervix. Although both tumors are cytokeratin positive, markers for EVT will be negative in squamous carcinomas. Occasionally, *PSTT may be confused with a sarcoma, in particular epithelioid leiomyosarcoma, or with a mesothelioma showing deciduoid morphology.* Immunohistochemistry will also easily differentiate between these tumors.

Epithelioid Trophoblastic Tumor

Clinical Features and Implications

The **epithelioid trophoblastic tumor** (ETT) is a recently described tumor believed to *arise from EVT of the chorion laeve.* It has immunohistochemical similarities to PSN and thus may represent its neoplastic equivalent. Clinical features are indistinguishable from PSTT. Patients generally are in the reproductive age group and present with vaginal bleeding. Most patients have an elevated β-hCG. The interval from preceding pregnancy is up to 18 years. *Approximately 25% of the reported cases have been malignant,* similar to that reported for PSTT. *Treatment and follow-up have also been similar to PSTT.*

Pathologic Features

On gross examination, ETTs are *tan to yellow, fleshy, infiltrative nodules in the endomyometrium* measuring up to 5 cm in diameter. Like PSNs, they are *commonly seen in the lower uterine segment*. They tend to show more necrosis than typical PSTTs. On histologic section, ETTs have a distinctive appearance with nests of *small, relatively uniform trophoblastic cells clustered around small vessels with surrounding geographic necrosis* (Fig. 25.12). The tumor cells are smaller and more monomorphic compared to those in a typical PSTT. The cells usually have *clear or vacuolated cytoplasm, and the nuclei contain finely dispersed chromatin with identifiable nucleoli.* The mitotic rate is variable. Many ETTs focally show a pattern reminiscent of typical PSTT.

Extrauterine Lesions of Extravillous Trophoblast

As with hydatidiform moles and choriocarcinoma, *lesions of EVT may occur in ectopic locations, such as the fallopian tube, ovary, mesosalpinx, and broad ligament.* Reported cases have included both PSNs and PSTTs. They are similar in appearance and behavior to their uterine counterparts and are *presumed to arise from previous ectopic pregnancies.* They are frequently associated with chronic salpingitis and endometriosis.

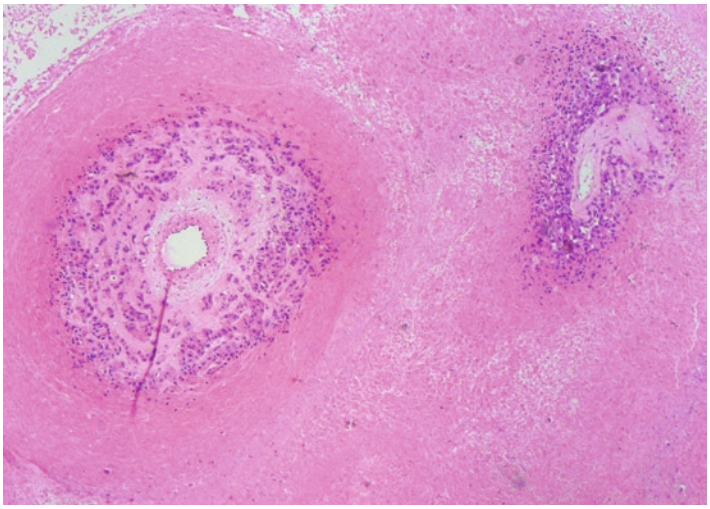

Figure 25.12. Epithelioid trophoblastic tumor consisting of a relatively monomorphic population of extravillous trophoblast surrounded by geographic necrosis. H&E ×20.

Another lesion, called **"trophoblastic implants,"** "residual trophoblastic tissue," or "persistent ectopic pregnancy," has also been described. Trophoblastic implants occur in up to 29% of patients with ectopic pregnancies treated conservatively with laparoscopic salpingostomy. They may be found in the adnexa, pelvic peritoneum, or even the omentum, and are *thought to represent residual extrauterine implantation sites that have not undergone full involution or excision.* Grossly, they appear as *hemorrhagic nodules* and may be confused with endometriosis by the surgeon. Microscopically, they consist of *degenerative nodules composed of EVT admixed with chorionic villi.* They do not show the hyalinization of PSNs, nor the infiltrative features, cytologic atypia, and proliferative activity of PSTTs. Serum β-hCG levels are often elevated. Patients may require additional surgery for excision of the lesions, but clinical follow-up has been benign.

Suggestions for Examination and Report
(Extravillous trophoblastic lesions)

Gross Examination: PSN and EPS are not grossly identifiable. PSTTs and ETTs are generally evident as infiltrative masses in the endomyometrium. Sufficient sections should be taken to adequately sample the tumor given its variable histologic pattern and to provide sufficient information for staging.

Comment: Immunohistochemistry is particularly useful in the diagnosis of these lesions. If diagnosis of a PSTT or ETT cannot definitely be made, serum β-hCG levels may be requested. If positive, it is helpful in making the diagnosis as well as for follow up. If negative, a neoplastic process cannot be ruled out. With PSN and EPS, a comment may be made about the benign nature of the lesion.

Table 25.1. Clinical features of trophoblastic lesions.

	PSN	EPS	PSTT/ETT	CCA
H/O previous mole	–	–	5–8%	50%
Serum β-hCG	Normal	Appropriate for pregnancy	Moderately elevated in 80%	Markedly elevated
Symptoms	50% have abnormal uterine bleeding	Related to pregnancy	Bleeding, uterine enlargement, or mass	Bleeding, uterine enlargement
Location	Often in lower uterine segment or cervix	Endometrium	Endomyometrium	Endomyometrium
Treatment	None	None	Hysterectomy; chemotherapy if malignant	Chemotherapy
Metastasis	None	None	Occurs in 10–15% of cases	Potential for metastasis
Prognosis	No sequelae	No sequelae	Guarded if malignant	>90% responsive to chemotherapy

PSN placental site nodule, *EPS* exaggerated placental site, *PSTT* placental-site trophoblastic tumor, *ETT* epithelioid trophoblastic tumors, *CCA* choriocarcinoma

Table 25.2. Histopathologic features of trophoblastic lesions.

	PSN	EPS	PSTT	ETT	CCA
Forms a mass	–	–	+	+	+/–
Chorionic villi present	–	+	Very rare	Very rare	–[a]
Fibrinoid	+	+	+	–	–
Hemorrhage	–	+/–	+	+	++
Necrosis	–	+/–	+	++	++
Vascular invasion	–	–	+	+	+
Degenerative changes	+	–	–	–	+
Extravillous trophoblast	+	+	+	+	–
Syncytiotrophoblast	–	+	–[b]	–	++
Nuclear pleomorphism	–	–	++	–	++
Mitotic activity	Minimal or absent	Minimal or absent	+	+	+

[a]Villi are present only in placental or in-situ choriocarcinoma (see Chap. 24)
[b]Multinucleated cells similar to syncytiotrophoblast may be present

Table 25.3. Immunohistochemistry of trophoblastic lesions.

	PSN	EPS	PSTT	ETT	CCA
Cytokeratin	+	+	+	+	+
EMA	+	+	+	+	+
hCG	Weak focal	+	Weak focal	Weak focal	+++
hPL	Focal	Diffuse	Diffuse	Focal	Focal
PLAP	Diffuse	Focal	Focal	Diffuse	
Mel-CAM	Focal	Diffuse	Diffuse	Focal	
Major basic protein	+/−	+	+	+	−
P63	+	−	−	+	+/−
α-inhibin	+	+	+	+	−
Ki-67	<5%		5–15%	5–15%	

Selected References

PHP5, Chapter 23, pages 846–853.

Allison KH, Love JE, Garcia RL. Epithelioid trophoblastic tumor: review of a rare neoplasm of the chorionic-type intermediate trophoblast. Arch Pathol Lab Med 2006;130:1875–1877.

Baergen RN, Rutgers JL. Trophoblastic lesions of the placental site. Gen Diagn Pathol 1997;143:143–158.

Baergen RN, Rutgers JL, Young RH. Extrauterine lesions of intermediate trophoblast. Int J Gynecol Pathol 2003;22:362–367.

Finkler NJ, Berkowitz RS, Driscoll SG, et al. Clinical experience with placental site trophoblastic tumors at the New England Trophoblastic Disease Center. Obstet Gynecol 1988;71:854–857.

Huetter PC, Gersell DJ. Placental site nodule: an analysis of 40 cases. Mod Pathol 1993;4:74A;abstract 422.

Kurman RJ, Main CS, Chen H-C. Intermediate trophoblast: a distinctive form of trophoblast with specific morphological, biochemical and functional features. Placenta 1984;5:349–370.

Roberts JP, Lurain JR. Treatment of low-risk metastatic gestational trophoblastic tumors with single-agent chemotherapy. Am J Obstet Gynecol 1996;174:1917–1924.

Rutgers JL, Baergen RN, Young RH, et al. Placental site trophoblastic tumor: clinicopathologic study of 64 cases. Mod Pathol 1995;8:96A.

Schmid P, Nagai Y, Agarwal R, et al. Prognostic markers and long-term outcome of placental-site trophoblastic tumours: a retrospective observational study. Lancet 2009;374:48–55.

Scully RE, Young RH. Trophoblastic pseudotumor: a reappraisal. Am J Surg Pathol 1981;5:75–76.

Shih I-M, Kurman RJ. Epithelioid trophoblastic tumor. A neoplasm distinct from choriocarcinoma and placental site trophoblastic tumor simulating carcinoma. Am J Surg Pathol 1998;22:1393–1403.

Shitabata PK, Rutgers JL. The placental site nodule: an immunohistochemical study. Hum Pathol 1993;25:1295–1301.

Young RH, Kurman RJ, Scully RE. Placental site nodules and plaques. A clinicopathologic analysis of 20 cases. Am J Surg Pathol 1990;14:1001–1009.