Chapter 4
Peritoneal Washings and Ovary

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Peritoneal Washings

- Benign findings and immunohistochemical study [1, 2].
  - Mesothelial cells are arranged in flat sheets (Fig. 4.1) with some space ("windows") between each cell. They have round or oval nuclei and a moderate amount of cytoplasm. Immunochemistry study shows positive mesothelial markers such as calretinin (+), WT1(+), and cytokeratin 5/6 (+).
  - Collagen balls are spheres of collages surrounded by flattened mesothelial cells (Fig. 4.2), which are seen in up to 50% peritoneal washing. They have no known significance.
  - Histocytes usually are present as aggregates or as isolated cells. They have granular or vacuolated cytoplasm, oval or folded nuclei, and show immunoactivity for CD68 and CD163.
  - Skeletal and adipose tissue can occasionally be found in peritoneal washings. Detached ciliary tufts (Fig. 4.3), presumed from endosalpingiosis, can also be seen.
- Benign/reactive findings and their mimickers [3, 4].
  - Endometriosis is a potential diagnostic pitfall and is rarely diagnosed solely by peritoneal washing. All essential diagnostic elements should be present for definitive diagnosis, including hemosiderin-laden macrophages (Fig. 4.4)

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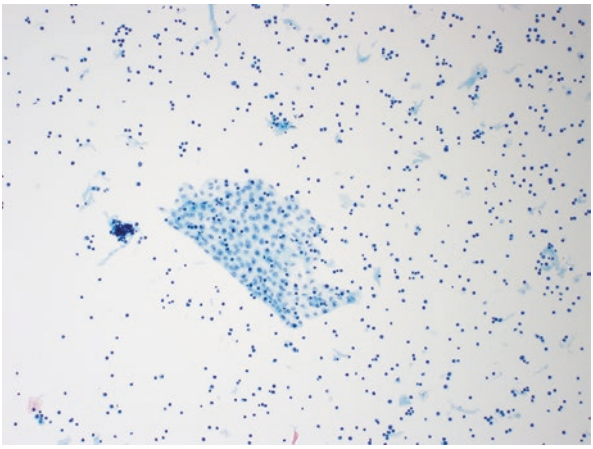

Fig. 4.1 Flat sheets of mesothelial cells are present (ThinPrep × 100)

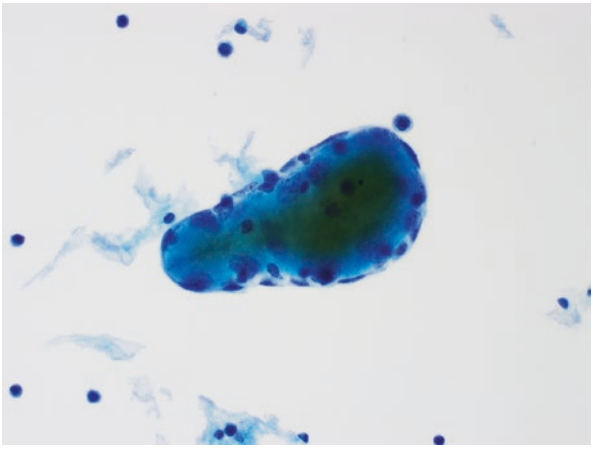

Fig. 4.2 Collagen ball (ThinPrep × 400)

or hemolyzed blood, endometrial epithelial cells, and endometrial stromal cells [5]. Additionally, the presence of glandular cells (endometrial cells) within the peritoneal washing may raise a differential diagnosis of malignancy, especially adenocarcinoma, which also stains positive for epithelial markers (Ber-Ep4 and Moc-31). In such cases, a cautious approach is advisable to avoid overinterpretation.

– Endosalpingiosis (Fig. 4.5) is present as benign ciliated epithelial cells with small nuclei and vacuolated cytoplasm in peritoneal washing. Association with psammoma bodies is common (Fig. 4.6). The differential diagnosis includes endometriosis and malignancy (Table 4.1).
– Peritoneal washing usually shows flat sheets of mesothelial cells, but frequently reactive mesothelial proliferations and hyperplasia can be seen, which can be diagnostically challenging. Reactive mesothelial proliferation can morphologically present as clusters, including papillary groups with promi-

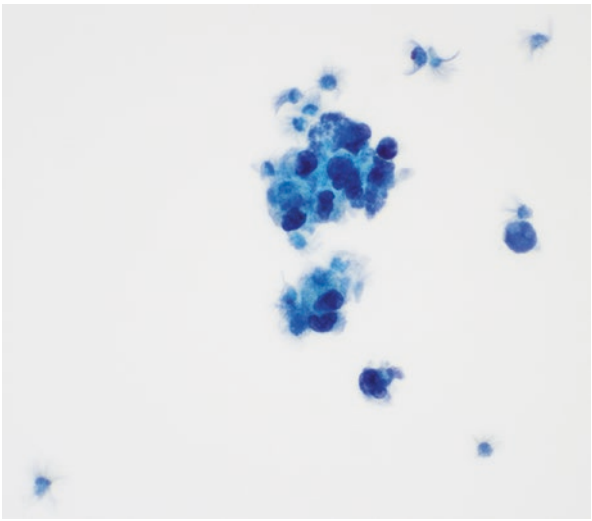

Fig. 4.3 Scattered detached ciliary tufts can be seen (ThinPrep × 600)

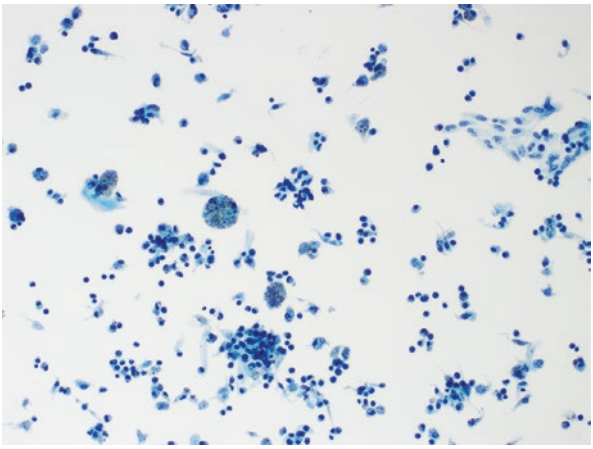

Fig. 4.4 Hemosiderin-laden histiocytes, few inflammatory cells and mesothelial cells are present (ThinPrep × 200)

nent nucleoli, and may show some atypia, multinucleation, cytoplasmic vacuoles, and occasionally psammoma bodies. Psammoma bodies are concentric lamination of calcification. The presence of psammoma bodies is not a sign of malignancy [6, 7]. However, it includes a list of differential diagnoses such as serous carcinoma, borderline serous tumors, serous cystadenoma, serous adenofibroma, benign mesothelial proliferation, endometriosis, and other Mullerian inclusion cysts.

- Artifacts
  - Mucoid-like material produced in surgical suction liner bags, made from thick opaque material, can mimic mucin. Diagnostically, it will pose more challenges if there is a prior history of the mucinous tumor.
  - Adhesion artifacts bring fibrin and histocytes in peritoneal washings.

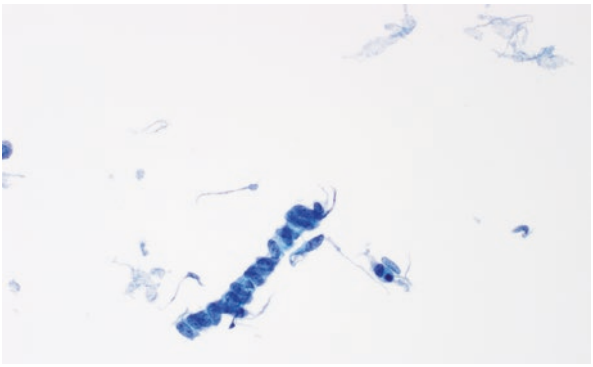

Fig. 4.5 Endosalpingiosis: bland columnar epithelial cells seen (ThinPrep × 400)

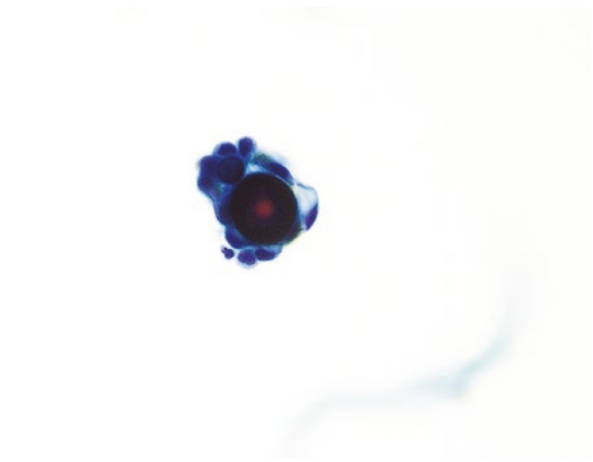

Fig. 4.6 Psammoma body with surrounding bland epithelial cells (ThinPrep × 400)

Table 4.1 Differential diagnosis of benign findings in peritoneal washings

Entities	Features	Differential diagnosis
Endometriosis	Presence of endometrial epithelial cells and/or stromal cells, histiocytes	Endosalpingiosis, Endometroid adenocarcinoma
Endosalpingiosis	Ciliated glandular epithelial cells	Endometriosis, reactive mesothelial hyperplasia, serous neoplasms, adenocarcinoma
Psammoma bodies	Concentric lamination of calcification	Endosalpingiosis, benign mesothelial proliferation, serous borderline tumor, and serous carcinoma
Reactive mesothelial cells	Cluster of cells with variable cytologic atypia	Mesothelioma Adenocarcinoma

Ovary

- Normal cytology [8, 9].
  - Ultrasound-guided fine needle aspiration (FNA) of cystic ovarian lesions occasionally is performed. This procedure is usually used to evaluate small, incidental cystic masses that appear benign on ultrasound or laparoscopic examination, tubo-ovarian abscesses, or rarely to confirm malignancy.
  - Ovarian cystic lesion FNA has variable sensitivity and false-negative rates, especially for borderline tumors [10].
- Non-neoplastic cysts [8–10].

  Follicle cyst, corpus luteum cyst, endometrioma, and paratubal cyst are non-neoplastic cystic lesions and cytomorphology features, and differential diagnosis are summarized in Table 4.2.

Table 4.2 Ovarian benign non-neoplastic cysts and differential diagnosis

Ovarian non-neoplastic cysts	Cytomorphological features	Differential diagnosis
Cystic follicle and follicle cyst	• Variable cellularity • Isolated cells and clusters of granulosa cells	Granulosa cell tumor
Corpus luteum cyst	• Variably cellular, cohesive aggregates of luteinized cells which have small dark nuclei and abundant foamy or granular cytoplasm with background hemosiderin laden macrophages	Granulosa cell tumor Endometriotic cyst
Endometriotic cyst	• Thick, chocolate-colored fluid (degenerative blood) is often only finding • Diagnostic triad: endometrial epithelial cells and stroma cells, hemosiderin laden macrophages	Endometroid adenocarcinoma
Simple ovarian and paratubal cyst	Sparsely cellular, mostly of macrophages and a few degenerated epithelial cells in sheets with round to oval nuclei, fine chromatin, and inconspicuous nucleoli	Follicle cyst Hydrosalpinx

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Conflict of Interest None.

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