



Regarding Ovarian Cancer

Occasionally patients will come in requesting a “cancer test” to screen them for “female” cancer. They are usually referring to the CA-125 blood test. There have been many stories written in magazines and viewed on television encouraging women to see their physician to have this test performed and check them for cancer. This article is written to help correct some common myths about checking for “female” cancer and the appropriate way to be evaluated.

Regarding Ovarian Cancer, CA-125 and Ultrasound

First, it is important to understand the difference between screening tests and diagnostic tests. Screening tests are the familiar procedures that are recommended for all healthy people, such as pap smears for all women, cholesterol assay, dental exams, blood pressure checks for all adults, etc. Screening tests are cheap and easy to do, and they have, by definition, been proven to save lives because they detect common mild or early abnormalities that, if treated, prevent bigger problems such as cervical cancer, heart attack, tooth loss, stroke, etc. The screening test does not provide much information in itself other than to say that further investigation of the situation by diagnostic testing is needed to see if a real problem exists and to see what treatment may be needed.

A diagnostic test is prescribed in response to an abnormal finding from a screening test or for a patient with a significant symptom or significant abnormal finding on an exam by a clinician. Most blood tests, x-rays, and procedures are considered diagnostic tests and the results must then be reviewed in the context of a long list of possible abnormalities.

The CA-125 blood test, an ultrasound, and the "total body scan" are all considered diagnostic tests, not screening tests, because they don't provide highly useful information when used by the larger population which has no abnormal finding of a screen, abnormal finding on an exam or abnormal symptom. Administering diagnostic tests to the larger population has been shown to provide few people value because of

the low likelihood of finding an abnormality, often results in many false positive findings, and costs much. One example would be taking a trip to Las Vegas in order to make money by gambling. Most everyone loses money, but one or two find great wealth. The tree test mentioned above have been researched well as proposed screening tests for the larger healthy population, and the results consistently show that there is little value to most in their use without symptoms, exam findings, or screening test indications. Many women find value in the reassurance that the above tests if normal will provide, and they can afford to pay the fee for this reassurance. Most people have fun in Las Vegas and are happy to afford the trip, and expect to lose money gambling for fun. The research shows that there are likely to be very few revelations by diagnostic tests used in a screening context that will save peoples lives or result in dramatic benefit. Everyone knows of some one person, from thousands taking the Total Body Scan, in whom a mass is found and whose subsequent surgery saved their life.

In the email being sent to many, one woman has told her story about being misdiagnosed with a gastro-intestinal problem, when in fact she had a peritoneal malignancy (a cancerous growth in the lining of her abdomen). Years earlier, her reproductive organs — including ovaries — had been removed, yet a malignancy appeared later in her abdomen identical to an ovarian carcinoma. In other words, she had an ovarian cancer like syndrome, but it had grown from her abdominal lining.

Primary ovarian cancer — which starts in the ovaries — occurs in 1 in 70 women, or 1.7%. Primary peritoneal cancer, which grows from the lining of the peritoneum, occurs in 1 in 2,000 women, or .05%. It is thus rare upon rare.

Her intestinal symptoms, in the absence of any ovaries, should have been tested out with colonoscopy and upper GI Endoscopy, study of her gall bladder and ruling out of colitis and irritable bowel syndrome. It is most reasonable to suspect bowel problems in a woman who has abdominal bloating, swelling and constipation/diarrhea, because intestinal problems and even intestinal cancer are more common than ovarian cancer, and cause the same symptoms. It is actually said, "the road to the diagnosis of ovarian carcinoma is paved with Pepto-Bismol."

Since the emailing woman had had her gynecologic organs removed, few doctors would immediately suspect that she might have such a rare type of carcinoma as peritoneal carcinoma (.16%), when colon cancer strikes about 8% of women, colitis much more, irritable bowel syndrome many more. But if all these tests were done and they were all normal, a CT Scan of her abdomen would be the next study to perform. This would have revealed the peritoneal cancer. Ca 125 and ultrasound were not indicated in her case. Ca125 tests for gynecologic problems, and ultrasound is the best test to measure the gynecologic organs: uterus, tubes, and ovaries, none of which she had.

If she still had her gynecologic organs and developed bloatiness and other GI symptoms, the a complete evaluation of the abdomen AND pelvis would likely have been performed In addition, any woman who has new symptoms from her intestinal

tract or gynecologic organs or new findings on her pelvic exam should definitely be evaluated by an ultrasound exam of the pelvis and serum Ca125. Additionally, whenever a pelvic or abdominal mass or fluid distension of the abdomen (called ascites) are observed, a CA-125 and CEA blood test should be obtained.

Perhaps some of the tumors she had could possibly have been felt by pelvic examination. One of the lessons here is that every woman, whether she has had a hysterectomy or not, needs a pelvic exam on a yearly basis. Many women forego this exam after their uterus, tubes and ovaries have been removed. Sometimes the primary care provider doesn't do pelvic exams, but women should then see a gynecologist for a yearly pelvic exam. While the annual pelvic exam itself does not have screening value (believe that or not, it is true! Pap of the cervix qualifies as a screen, but not pap of the vagina or palpation of the pelvis), it can reveal a pelvic mass that the patient may not have noticed. The pelvic should also include rectal exam in every woman over age 40 to feel for polyps and check for hidden blood in the stool (fecal blood testing over age 40 qualifies as a screening test)

CA-125: Good for Diagnosis, Not useful in Screening

The story circulating on the Internet encourages women to insist that their doctors test the levels of the protein CA-125 in their blood. However, all the medical studies have shown that the CA-125 test is not an effective screening tool in the general population of menstruating women.

Among menstruating women, the Ca125 has been shown to be frequently elevated if they have fibroids, adenomyosis, endometriosis, diverticulitis, and many benign, non-surgical entities that are not a problem. Broad testing of healthy reproductive-aged women has been shown to result in many high CA-125 counts, which then lead to much worry, much testing, and even many surgeries for benign masses, which will find very few otherwise undetectable cancers. This is because many benign tissues secrete CA-125. By definition, in a pre-menopausal woman, the uterine lining is actively growing and the ovaries are actively secreting, thus many perfectly normal women will have elevated Ca125's fluctuating every month. For these reasons, the CA-125 is ordered for pre-menopausal women only when symptoms or pelvic exam findings have raised concern. If the results show an elevated CA-125 level, then further testing will be necessary, and often surgery as well.

Peritoneal cancer occurs extremely rarely: about 1 in 2,000 women. Ovarian cancer is much more common, about 1 in 70 women. After removal of the ovaries from most women, peritoneal cancer is incredibly rare, unless there is a mutation in the BrCa gene. The BrCa gene makes a protein that protects women from cancers. About 1 in 500 women, or .2% have a mutated copy of the gene, but this mutated gene is responsible for about 7% of breast and 10% of ovarian cancers. In these families many women will have breast cancers, bilateral breast cancer, breast cancer at a young age,

or ovarian cancer, and most rarely, peritoneal cancer. If a woman's family tree has many members with these features, or if genetic testing has already indicated one of the members has a mutation of the BrCa gene, then she should see a geneticist or Gynecologic oncologist about testing for BrCa mutation in herself. Also a CA-125 test and diagnostic ultrasound may be appropriate for her, even in the absence of symptoms or abnormal results from a screening test. Elevated CA-125 levels in women with a BrCa positive mutation indicate the need for investigation. It should be stressed here that CA-125 does not prevent malignancy, but if it is elevated, it can help to diagnose cancer earlier.

For post-menopausal women, the CA-125 blood test is a good diagnostic tool, because their ovaries and uterine lining are normally inactive and not secreting any Ca125-like proteins. Research confirms that for older women, this test is a reliable way to find problems in the gynecologic organs. Occasionally the problem may actually be found in the heart, pancreas, thyroid or lungs, or turn out to be benign gynecologic changes. An elevated CA-125 count in a postmenopausal woman indicates the need for further testing, probably including surgery. But even in the post-menopausal woman, and certainly in the hysterectomized/oophorectomized woman, Ca 125 is not useful as a screening test.

In our practice, we see many younger women with elevated CA-125 levels, between 35 and 100 (normal is under 35). When this happens, the next step is an ultrasound test, which usually reveals that the pelvic anatomy is normal. So then we discuss endometriosis or the other non-cancer causes of elevated CA-125, but the women are still somewhat scared. At this point, we can use further scheduled CA-125 testing on days 12 and 26 of the menstrual cycle to confirm fluctuations with the cycle and that the problem is benign endometriosis or adenomyosis. A CA-125 level on day 26 that is nearly twice the level observed on day 12 is very reassuring for a diagnosis of endometriosis or adenomyosis, because the level should fluctuate over the month if it is caused by monthly fluctuation of cycling tissues. Surgery is not necessary in the absence of bothersome symptoms or abnormal ultrasound findings. A CA-125 over 100 can still be endometriosis, but detailed investigation is needed—and this may need to include laparoscopic biopsies, or possibly more surgery.

Ultrasound: a valuable, non-surgical diagnostic tool

Trans-vaginal ultrasound is highly reliable in measuring the size and shape of the uterus and ovaries. Unlike the CA-125, the error rate for diagnosing cancer is low for vaginal ultrasound. The "pictures" we get from ultrasound can be put into four categories: benign and okay to ignore, benign and must be removed, probably benign but must be removed to be sure, and cancerous.

Benign: Ultrasound can tell the difference between the characteristic features of cancer and those of benign "functional" cysts, which normally come and go on ovaries.

Remember that ovulation is the function of making cysts with eggs every month. "Simple" cysts look like a water balloon containing pure fluid with no internal walls or any solid areas on the outer walls. If smaller than 2 inches, "simple" cysts need no further follow up because their risk of malignancy is under .3%, even if they do not disappear over time.

Benign but must remove: Larger "simple" cysts may be observed for a while to see if they go away, but may need removal because they may twist. Dermoid cysts fall into this category as they have a 1% chance of malignancy, but must be removed. Endometriosis cysts should also be removed.

Probably benign, but must remove to be sure it is not cancer: "Complex" cysts have solid areas in the walls, on the inner linings or contain multiple cysts and can be malignant between 8-30% of the time. They should be removed surgically, usually by laparoscopy, without spillage into the peritoneal cavity, for microscopic study to confirm that they are not cancerous.

Ovarian Cancer: In cases of ovarian cancer, ultrasound usually reveals complex cysts on one or both ovaries, multiple solid masses, nodule on the bowel or excess pelvic and/or abdominal fluid.

More about OVARIAN CANCER Risk Factors: Low # children. Never used oral contraceptives, some families with extensive cancer rates or BrCa1 or 2 positivity, urban, extensive use of fertility drugs without conception.

Screening: None, but do have yearly pelvic exam. Report any vague symptoms in abdomen or pelvis. Can test with vaginal ultrasound, Ca125 if concern.

Symptoms: Vague change in gastro intestinal tract function or urinary function, pelvic or abdominal pressure or pain, abdominal swelling or mass.

Treatment: Surgical removal of all visible cancer, removal of uterus, tubes, ovaries, lymph nodes, appendix and omentum (fat pad in abdomen), followed by chemotherapy.

Survival: 40% overall. 88% if early. 15-45% if advanced.

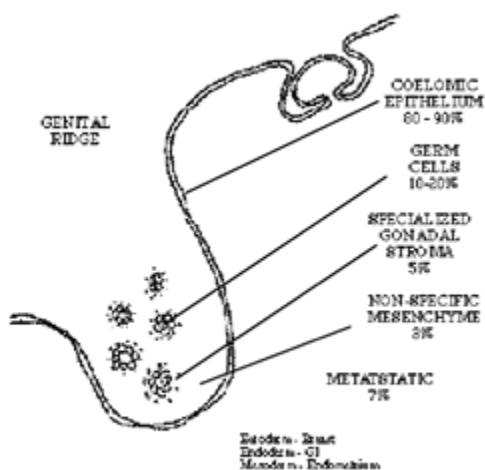
Risk Reduction: Oral contraceptives for 5 years reduces risk by 25% and for 10 years reduces risk by 50%, tubal ligation reduces risk by 50%, large number of children. Remove ovaries.

OVARIAN CARCINOMAS

2% of all women. Incidence increasing to 4% in 20 years. 18,000 new cases of ovarian carcinoma yearly (23% of all GYN cancers); 11,400 deaths yearly due to ovarian carcinoma (47% of GYN cancer deaths).

Embryological origins:

4th Week: **GERM CELLS** migrate to the genital ridge, where they induce a proliferation of the underlying **NONSPECIFIC MESENCHYME** into **SPECIALIZED GONADAL STROMA** within the covering invested by **COELOMIC EPITHELIUM**. These are the cancer cell lines:



I. Coelomic Epithelium

- A. Serous tumor
- B. Mucinous tumor
- C. Endometrioid tumor
- D. Mesonephric (clear cell) tumor
- E. Brenner tumor
- F. Undifferentiated carcinoma
- G. Carcinosarcoma and mixed mesodermal tumor

II. Germ Cell Tumors

- A. Teratoma
 1. Mature teratoma
 - a. solid adult teratoma
 - b. dermoid cyst
 - c. struma ovarii
 - d. malignant Neoplasm's arising from mature cystic teratoma
 2. Immature teratoma (partially differentiated teratoma)
- B. Dysgerminoma
- C. Embryonal carcinoma
- D. Endodermal sinus tumor
- E. Choriocarcinoma
- F. Gonadoblastoma

III. Specialized Gonadal Stroma

- A. Granulosa-theca tumors
 1. Granulosa tumor
 2. Thecoma
- B. Sertoli-Leydig tumors
 1. Arrhenoblastoma
 2. Sertoli tumor
- C. Gynandroblastoma
- D. Lipid-cell tumors

IV. Nonspecific Mesenchyme

- A. Fibroma, hemangioma, leiomyoma, lipoma
- B. Lymphoma
- C. Sarcoma

V. Neoplasms Metastatic to the Ovary

- A. GI tract (Krukenberg)
- B. Breast
- C. Endometrium
- D. Lymphoma

BORDERLINE TUMORS OF THE OVARY

Not benign because there is cytologic and architectural atypia - e.g., nuclear hyperchromasia, enlargement and pleomorphism, prominent nucleoli and increased mitotic activity. Can see necrosis, inflammation and psammoma bodies, frequent tufting, stratification and complex papillary architecture. Can recur.

Not malignant because there is no stromal invasion in the ovaries, despite severe atypia and frequent mitosis. Can be seen in ovaries with benign and malignant elements.

Risk factors : Pregnancy reduces-OR.54 with P2 and ,37 with P4 children, ocp >5 years reduces risk by 25% and for 10 years by 50%. Breast feeding

Work-up: Sonogram - complex cysts are usually seen with intracystic papillation, mural nodules, some septa. Get Ca125 and CEA.

Serous Epithelial Carcinoma, LMP, comprise 50%

- a. stratification of epithelial lining of papillae to 4mm or less cell layers
- b. papillary projections, tufts from epithelial linings of papillae, individual cells
- c. Intra-epithelial carcinoma: cribriform area > 4mm. If >4mm treat as invasive primary.

Mucinous Epithelial Carcinoma, LMP, comprise 30%

- a. papillary structure + solid thickening 25-50%
- b. epithelial stratification of 2-3 layers
- c. rarely bilateral (5%). Think invasive carcinoma if bilateral.

Can see pseudomyxoma ovarii. Do appendectomy and run bowel for all mucinous pathology. Can see intraepithelial carcinoma if >4 layers thick.confluence or thick stratification. Borderline are typical to mild atypical or intraepithelial carcinoma, or intraglandular mucinous carcinoma, or cribriform less than 10 mm². Usually unilateral, but bilateral can be primary or metastatic. 98% survive stage I but only 35% survive higher stages especially when metastatic deposits are invasive--treat these as malignant and invasive. Rupture does not increase recurrence. Higher stage--think appendix and pseudomyxoma peritonei. See filiform papillae (little storma).or severe nuclear atypia with marked nuclear stratification >4 cells height. Many goblet cells and AMF's. Gland mucus can rupture into stroma with histiocytic response.

Endometrioid Epithelial Carcinoma, LMP, very rare
can see atypical endometrioid hyperplasia in glands with stroma
endometriosis seen adjacent, or elsewhere in pelvis
often seen with unopposed estrogen or obesity.

Implants - **20% metastatic to abdominal surfaces. Resect these implants, not peel off, to see if invasive.**

Therapy for Borderline Ovarian Tumors

Stage IA: Fertility desired: LMP or grade 1 and appears Stage IA, do USO, only and get frozen section. Do washings, nodes, omentectomy, appendectomy, biopsy contralateral ovary if pathologist cannot rule out grade 1 invasive cancer.
May need to return for TAH-BSO if biopsies show Grade 2 or Stage II or higher.
Fertility not desired- TAH-BSO and frozen section for possible staging.

Chemotherapy is not helpful. .5% recurrence

Stage II-IV: TAH-BSO, Debulking, Staging: omentectomy, appendectomy, nodes. Resect all metastases to make sure they are not invasive, which would indicate chemotherapy.

No residual—observe and reassure.

Bulky residual--observe. Small possibility of transition into invasive over time, so try to resect all.

Recurrence: Debulking laparotomy. Pathology to see if recurrence is higher grade and to improve disease-free interval. If still LMP then follow. If invasive then chemotherapy with Tax and CBDCA

Prognosis

168 cases of Stage I serous LMP tumors from the series above there were two recurrences, both in the preserved ovary. Many of higher stages whose tumors persist were still clinically well, without progression or symptoms.

Of 234 mucinous LMP tumors in Stage I, 9 recurred and all died of disease. Approximately 40% of Stage III mucinous LMP tumors die (pseudomyxoma peritonei occurs from ruptured appendix). Remove appy, and all peritoneal lesions.

If metastases are **not invasive:**

Stage	survival	survival
I	98	99
II	95]
III	56]92
IV	40]

When metastases are **invasive:**

Stage	survival	survival
I	98	99
II	95	
III	56	
IV	40	

MALIGNANT EPITHELIAL OVARIAN NEOPLASMS

Risk: <2% lifetime risk but usually ages 50 - 60 years

Factors: Obesity. Age. Industrial countries. O.C.'s: .6 relative risk No virus implicated. Low parity. Delayed childbirth.

Symptoms:: None. Bloating, dyspepsia, constipation, tenesmus, pressure symptoms - 25% see LMD for above, must be "observed"

Signs: Increased abdominal girth, ascites, mass, postmenopausal palpable ovary, obstruction of GI tract

Staging: Surgical. Determines type of therapy.

The FIGO Staging for Primary Carcinoma of the Ovary (1985)

Stage I: Growth limited to the ovaries.

Stage Ia Growth limited to one ovary; no ascites. No tumor on the external surface; capsule intact.

Stage Ib Growth limited to both ovaries: no ascites. No tumor on the external surfaces; capsules intact.

Stage Ic Tumor either stage Ia or Ib but with tumor on surface of one or both ovaries, or with capsule ruptured; or with ascites present containing malignant cells or with positive peritoneal washings.

Stage II: Growth involving one or both ovaries with pelvic extension.

Stage IIa Extension and/or metastases to the uterus and/or tubes.

Stage IIb Extension to other pelvic tissues.

Stage IIc Tumor either stage IIa or IIb. but with tumor on surface of one or both ovaries: or with capsule(s) ruptured; or with ascites present containing malignant cells or with positive peritoneal washings.

Stage III: Tumor involving one or both ovaries with peritoneal implants outside the pelvis and/or positive retroperitoneal or inguinale nodes. Superficial liver metastasis equals stage III. Tumor is limited to the true pelvis but with histologically proven malignant extension to small bowel or omentum.

Stage IIIa Tumor grossly limited to true pelvis with negative nodes but with histologically confirmed microscopic seeding of abdominal peritoneal surfaces.

Stage IIIb Tumor of one or both ovaries with histologically confirmed implants of abdominal peritoneal surfaces none exceeding 2 cm in diameter. Nodes are negative.

Stage IIIc Abdominal implants greater than 2 cm in diameter and/or positive retroperitoneal or inguinale nodes.

Stage IV: Growth involving one or both ovaries, with distant metastases. If pleural effusion is present, there must be positive cytology. Parenchymal liver metastases equal stage IV.

Stage of Carcinomas of the Ovary by Histologic Subtype: Percentage in Each Stage

	Mucinous	Endometrioid	Clear Cell	Serous	Undiff	Cases	All
Stage	(N = 123)	(N = 205)	(N = 63)	(N = 283)	(N = 155)	(N = 829)	
I	19.1	50.8	47.6	35.2	57.1	26.5	
II	23.0	28.7	24.5	25.5	25.4	29.2	
III	43.1	13.9	21.2	27.6	7.9	26.5	
IV	14.8	6.5	6.7	11.7	9.5	17.7	

Aure et al, 1971.

Invasive Mucinous destructive stromal invasion **SPREAD:**

Intestinal type Infiltrative - always see intraepithelial, can see invasion into stroma.

Microinvasive act like borderline. Any stage over I see stroma invasion

Stage I 10% recur.

Expansile confluent nests of glands with almost no stroma. Can see broad areas of cribriform.

Endocervical mucinous type are more bilateral (40%) 20% with endometriosis, smaller,

more unilocular, with gross evidence of papillae. See mucoid polypoid projections into cyst. With endocervical mucinous highly stratified >4 up to 10 to 20 cells thick cells. Papillae are covered with cells lymphocytic infiltrate. Cells Note no deaths or recurrences. Rarely spread as discrete glands or lymph nodes
If mucinous high stage rule out high stage. Multinodular, surface implants on ovary, ovary with lymphatic invasion by tumor. (rarely seen vs in primary ovary)

Mechanism of spread:

1. Intra abdominal currents allow cytologic seeding to follow flow clockwise:
2. Pelvis: right gutter to right hemidiaphragm through Bochdalek's foramina surface of small bowel, liver, and omentum
3. Lymphatic: through peri Aortic nodes to mediastinum to supraclavicular to lung
4. Hematogenous: rare

SURGICAL MANAGEMENT AND STAGING:

Vertical Incision

Opening cytology:

20% of Stage I/II Positive.

30% are upstaged at re-exploration because of spread to para-aortic nodes, pelvic nodes, cul-de-sac, diaphragm, omentum.

Run large and small bowel.

Omentum: 25% of Stage I and II Positive

Pelvic and para-aortic nodes--45% occult positives. 3-6% of Stages I/II are positive.

Debulk all tumor. >75% of patients can be meticulously debulked to zero by GYN Oncologist when previous surgeon referred as non-debulkable. TAH-BSO, Infracolic omentectomy is standard. Do lymphadenectomy if well debulked, or to complete debulking. If cannot reduce bulk safely then relieve impending problems: i.e., remove large masses, relieve bowel obstructions, avoid future bowel obstructions.

ChemoTherapy for invasive epithelial carcinoma of the ovary:

Usually carboplatin with Taxol for 6 courses. Follow CA-125 and do clinical exam to r/o progression on chemo.

Second Look: Not standard. The procedure requires a methodical, meticulous exploration of the abdomen and pelvis, with four-quadrant peritoneal cytology specimens, biopsy of all lesions, all sites where residual left (must study original surgical report), resection of all adhesions, removal of omental pedicles, resection of ovarian pedicles with peritoneum. Resection or biopsy of cul-de-sac peritoneum, bowel adhesions, and peritoneal patches from paracolic gutters. Selective dissection of pelvic and aortic lymph nodes if not done previously. Appendectomy, if not already done. Removal of residual uterus, tubes, and ovaries. Resection of all residual carcinoma.

Four types:

1. Interval Primary debulking: Debulking of patients with a large tumor bulk who could not or were not debulked initially. Given after two or three courses of chemotherapy.
2. Interval Recurrence debulking: Debulking of patients who progress (new mass grows) during initial platinum containing chemotherapy regimens. Rarely appropriate or indicated as prognosis very poor.
3. Classic Second look: Procedure does not prolong life and has no indication currently. Useful in protocols to assess disease status. Also useful if patient did not have all indicated procedures prior to initiating chemotherapy. Goal is to determine if patient appears to be disease-free in order to stop therapy. Eligible patients must have no evidence of tumor by CT, sono, or MRI, and a negative CA-125.
4. Resection of post-chemo recurrent mass: Can debulk again if recur more than six months since completion of chemo and tumor initially responsive to chemo. Not appropriate if none of the available chemotherapeutic regimens are effective for ovarian tumors, or if recurrence occurs in less than six months after completion of chemotherapy because prognosis poor. Don't operate unless there is reasonable chemo plan available, but do relieve obstructions, palliate pain.

Therapy for recurrent tumor: If patient was originally sensitive to cisplatin, can give this in higher doses. Intraperitoneal chemotherapy may hold promise for the future; studies underway now. Resistance modifiers should be considered.

METASTATIC DISEASE TO OVARY

Get good history, while ruling out metastatic disease carefully. Always rule out met if high stage mucinous. All ages 29-89, bilateral, cystic, ovaries. Do very thorough exploratory laparotomy.

Colon

Gastric

Breast

Pancreas

Appendix

Pseudomyxomatous Peritonei Carcinoma

- Clinical condition of gelatinous mucin filling peritoneal cavity mucinous implants and fibrous adhesion.
- Associated with appendix, ovary, intestine, bile duct and pancreas.
- Histogenesis: peritoneal metaplasia
- Rupture of ovarian cyst with implantation
- Now believed a form of metastasis sites of peritoneal fluid accumulates in right hemidiaphragm and in pelvis.
- Clinical symptoms distension, age mid 50 acute appendix anorexia and early satiety from gastric compression.
- Micro: see much mucin without mucin cells or with a scanty epithelium showing low grade atypia = low grade adenomucinosis. Or see mucin with abundant epithelium showing high grade atypical peritoneal mucinous carcinomatosis see

inflammatory reaction with lymphocytes. If see clusters of signet ring then think adenocarcinoma.

Pseudomyxoma ovarii - Condition limited to ovary

- Pseudomyxoma peritonei usually with atypical adenomas, possibly with high grade dysplasia (ACIS) or low grade adenocarcinoma or high grade carcinoma.
- Very rare because high grade grow so fast causing mortality.
- Appendix is usually the origin of PMP. Whatever we see in the ovary is secondary involvement, synchronous tumors. Bilateral ovarian tumors are usually metastases of PMP and have predominant surface involvement. Can see separate tumor if ovarian tumor is large, if there is benign mucinous.