Common solid tumors

by Prof.Abdel Warith

Note: Doctor said that the slides are more than enough for exam!

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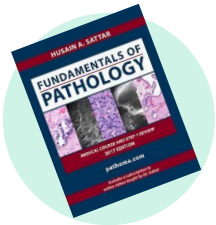
Objectives:

- **Pathological classification and staging of solid tumors**
- **Common solid tumors world wide and in Saudi Arabia**
- **Study of Two common solid tumors: breast cancer and colorectal cancer regarding: risk factors, clinical presentation , early detection, diagnostic tools, broad lines of management, and prevention.**

References:
Slides - Black
Doctor's notes - Red
Step up - Blue
Master the boards - green
Extra explanation - Grey

Optional:



Editing file

- **Solid malignancies classification:**

Epithelial Tissues		Connective Tissues	
Surface	Glandular	Bone	Soft Ex: blood vessels, cartilage
Carcinoma	Adenocarcinoma	Sarcoma	

- **Comparison:**

Carcinoma	Sarcoma
Cancers derived from epithelial cells. This group includes many of the most common cancers, breast, prostate, lung, pancreas, and colon.	Cancers arising from connective tissue (i.e. bone, cartilage, fat, nerve), each of which develop from cells originating in mesenchymal cells outside the bone marrow.
• Carcinoma go through Lymph nodes(most common), blood stream,through cavities, Transcoelomic • Carcinoma go by station, on breast cancer operation we do sentinal lymph node biopsy (first lymph node or group of nodes draining a cancer, like a gate) • If cancer not found in sentinal node, they don't proceed to axilla. • In gastric carcinoma, the spread is Transcoelomic (metastasis refers to the dissemination of malignant tumors throughout the surfaces and organs of the abdominal and pelvic cavity covered by peritoneum),happen in gastric, pancreatic and adrenal carcinoma, this type of spread doesn't happen in sarcoma. • In peritoneum the spread of carcinoma is tranceolumic, after dissecting a tumor from peritoneum (eg.ovarian mass) and send to pathology if the malignant cells are found on the surface then its malignancy, if its inside then no malignancy.	• When doing bone scan for sarcoma that had mets on lung, the lung mets pick bone scan dye (diagnostic for osteogenic sarcoma). • In bone sarcoma, look for metastasis in lung. • In old age when find osteogenic sarcoma, the choices are to operate immediately or wait for CXR(long time ago they didn't have crept cell salvage) so they give it 6 month and follow with CXR (they didn't have high resolution CT or bone scan like we do now) if no mets in lung, they do amputation. usually spreads by hematogenous route and rarely by lymphatics

Germ cell tumor: Cancers derived from pluripotent cells, most often presenting in the testicle or the ovary (seminoma and dysgerminoma, respectively).

Blastoma: Cancers derived from immature "precursor" cells or embryonic tissue (hereditary). These are also most common in children. *blastoma* as a suffix, with the Latin or Greek word for the organ or tissue of origin as the root. hepatoblastoma, neuroblastoma.

- Some types of cancer are named for the size and shape of the cells under a microscope, such as giant cell carcinoma, spindle cell carcinoma, and small cell carcinoma.

- General Staging of solid malignancies (BASIC): Actually malignancy staging are about 15 stage and each one of them has its own tumors.

General staging of solid malignancies		
	Early	Local +/- systemic: confined to the organ Tx: local
	Locally advanced	Local AND systemic: go outside the organ like locoregional lymph nodes, doesn't reach distant site, Eg. breast mass and axillary lymph node BUT if breast mass on left breast and axillary lymph node on the right side this means it's metastasize. Lymph nodes by them self are not locoregional, it has to be the draining lymph node like the Lung and paratracheal hilar lymph node, bladder and iliac lymph node. Tx.local & Systemic
	Metastatic	Systemic +/- Local

Tx = treatment

- **2009 Estimated US Cancer Cases**
- **Prostate is the highest cancer for men 25%**
- **Breast is the highest cancer for women 27%**

COMMON SOLID TUMORS

- **In the U.S., The three most common cancers:**
- **Men**: Prostate, lung, colorectal
- **Women**: Breast, colorectal, lung

- **In the KSA., The three most common cancers:**
- **Men**: colorectal, Lymphoma, leukemia
- **Women**: Breast, Thyroid, colorectal.

Facts:
2nd most common cancer, (1st is colorectal)
1st most common cancer in females.
2nd leading cause of death, (1st is lung)

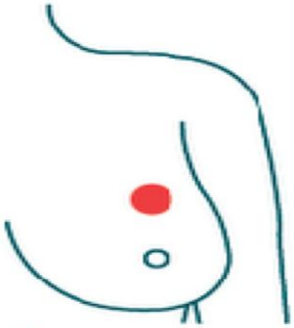
BREAST CANCER

- **Over 75% of women who are diagnosed with breast cancer are age 50 or older.**
- **Men can get breast cancer, although this is very rare. For every man who is diagnosed, over 100 women are found to have breast cancer.**
- **Most women—about 80%—who get breast cancer do not have a sister or mother who has breast cancer.**
- **Excluding skin cancer, breast cancer is the most common cancer in women.**
- **1990s the breast cancer death rate declined by the largest amount in over 65 years.**
- **Heart disease is the leading killer of women.**
- **Approx 97% of women diagnosed with breast ca at an early stage survive 5 yrs or more.**
- **There is no single cause of breast cancer. Research has shown that several different factors increase the risk of breast cancer.**
- **Genetic and lifestyle differences increase the risk for some cancers.**

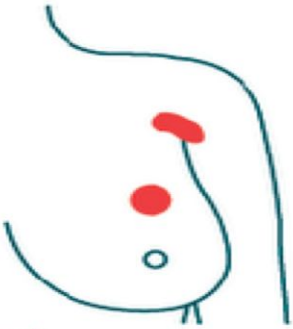
- **Risk factors** Anything that will increase estrogen exposure
- **History of breast cancer** in one breast **(do follow up mammogram for both breasts).**
- **Family history of breast cancer, especially in first-degree relatives.**
- **Benign breast diseases / atypical hyperplasia.**
- **Early menarche ,late menopause (long period of exposure).**
- **Late first pregnancy/no pregnancy (Multiple pregnancy and lactation are protective against breast cancer).** → Decrease in estrogen & increase in progesterone
- **Exogenous estrogens (oral contraceptive, postmenopausal hormones).**
- **Radiation (HD).**

Radiation (HD). = radiation therapy for Hodgkin's disease

- **Breast cancer staging (general):** **Memorise the staging writing in the picture**

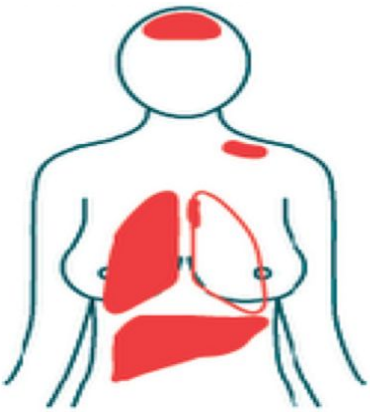


Stage 1
Early disease: Tumour confined to the breast (node-negative)



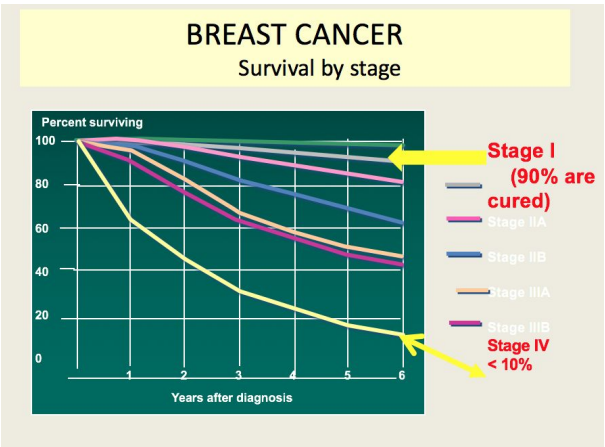
Stage 2
Early disease: Tumour spread to movable ipsilateral axillary node

Stage 3
Locally advanced disease: Tumour spread to the superficial structures of the chest wall involvement of ipsilateral internal mammary lymph nodes



Stage 4
Advanced (or metastatic) disease:
metastatic present at distant sites such as bone, liver, lungs and brain and including supraclavicular lymph node involvement

- **Breast cancer staging, cont'd**



!
- **Breast contain epithelial (ducts and glands) and connective tissue (fibrous tissue and fat cells), they are in continuous proliferating especially during pregnancy and lactation. Growth factor responsible for this proliferation is estrogen. With high levels of estrogen there are increased proliferation in addition to increased mutation incidence and thus increased chance of cancer.**
- **Staging are important in the prognosis and treatment of the patient.**

!
- **Usually patient with stage 4 cannot be cured.**
- **Early detection of the disease preferably to be at stage 1.**
- **Early detection by screening, public awareness and physician awareness.**

- **<u>Rules for DDX:</u>**

1. **common is common,(eg. if a 30 yo female came with fever do you diagnose her with SLE or infection ?? Of course infection because it's the commonest,**

   Eg.female with hypotension and low grade fever, addisonian crisis or sepsis ?? Sepsis of course because common).
2. **Treatable or not (eg. Pt coming with hemiplagia we diagnose with MS stage 3 which is untreatable)**
3. **Serious or not (rule out)**
4. **hereditary and rare diseases.**

A Good Breast Health Plan:
1.Mammograms (Screening does not include symptomatic patient, screening is for the asymptomatic)
2.Self Awareness (Monthly Self Exams) (BSE)
3.Physician awareness

***Mammography* refers to x-ray of the breast. Mammography is used to detect and diagnose breast disease both in women who have breast *symptoms* (problems such as a lump, pain or nipple discharge) and women who are *asymptomatic* (no breast complaints).**

- **Early diagnosis is the key to surviving breast cancer. Mammography can prevent thousands of breast cancer deaths each year. Regular screening mammograms are the best way to detect breast cancer early, when it is easiest to treat.**
- **When having a mammogram, women should ask their doctor when they can expect to receive the results. Regulations facilities to send women their results within 30 days.**
- **Older women are at highest risk for breast cancer, yet they are the least likely to get mammograms.**
- **The ACS can tell women where they can get a mammogram. Call 1-800-ACS-2345.**
- **By law, all mammography facilities must be certified by the U.S. Food and Drug Administration.**
- **They must meet standards for the equipment used, people who work there, and records that are kept.**
- **Mammography can detect cancers several years before it can felt through a clinical exam.**
- **Breast abnormalities are discovered in one of three ways: by a woman herself, by her HCP during a physical exam, or by a mammogram. Many breast cancers are found by the woman herself, but the smallest cancers are found by mammograms.**
- **Low-cost and free mammograms are available to low-income women through their local or state health department.**
- **Annual mammograms are covered by Medicare and Medicaid.**
- **Most breast lumps are not cancer.**

Clinical Breast Examination

A clinical breast examination (CBE) is an examination of your breasts by a health professional, such as a physician, nurse practitioner, nurse, or physician assistant.

For this examination, you undress from the waist up. The health professional will first *inspect* (look at) your breast for changes in size or shape.Then, using the pads of the fingers, the examiner will gently *palpate* (feel) your breasts. Special attention will be given to the shape and texture of the breasts, location of any lumps, and whether such lumps are attached to the skin or to deeper tissues.

- **The area under both arms and above and below the collar bones will also be examined.**

During the CBE is a good time for the health professional to teach breast self-examination to the woman who does not already know how to examine her breasts.

Ask your doctor or nurse to teach you and watch your technique.

- **Breast Self-Examination (BSE)**

1. **Performing monthly breast self-examinations, beginning at age 20**
2. **During the CBE is a good time for the health professional to teach breast self-examination to the woman who does not already know how to examine her breasts.**
3. **Ask your doctor or nurse to teach you and watch your technique.**

Remember:
Breast cancer:

- **Most common cancer in females.**
- **Wide age range 20 - +70y.**
- **Breast cancer can occur during pregnancy ,during lactation.**
- **Breast cancer can occur in pre, peri and postmenopausal females.**

! Mammogram is NOT done for young Females -> due to high density breast
Mammogram is NOT done for pregnant women
We use Ultrasound in above cases instead of mammogram
Otherwise Mammogram is the initial test

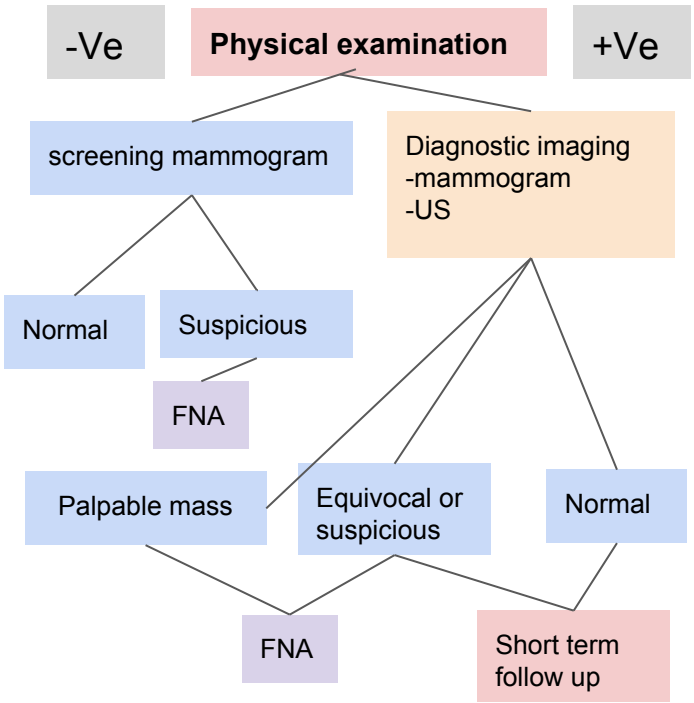
- **One of the most important steps in diagnosing Early Breast cancer is suspecting it., What To do ?**
- **Do not just reassure the patient**
- **Do not give hormonal therapy**
- **Do not give antibiotics**
- **Careful history (Ask about the risk factors)**
- **Careful physical ex (Examine (normal breast first, axillary and supraclavicular lymph nodes).**
- **Perform Bilateral mammogram + breast US +/- Fine needle aspiration.**

- **Diagnostic tests:**
  Biopsy if the best initial, Types:
  1-FNA: best.
  2-Core needle biopsy: can test for ER, PR and HER 2\neu.
  3-Open biopsy: most accurate, done while patient in operating room followed by immediate resection of cancer.

- **To improve prognosis:**
  1-EARLY DIAGNOSIS
  2-EARLY & PROPER INTERVENTION (Active prevention of pre invasive conditions such as treating previous hyperplasia in the breast)

Women should seek immediate medical advice is they have any of these warning signs:

- **A mass/lump that is painless, hard, and has irregular edges is more likely to be cancerous, but some rare cancers are tender, soft, and rounded.**
- **A change in the size or shape of the breast.**
- **A change in the way the skin of the breast, areola, or nipple looks or feels (for example, scaly, warm, swollen, red)**
- **Many of these breast symptoms are due to benign breast conditions but only a doctor can really give you a diagnosis**



Warning signs and symptoms:

- **Painless or painful lump, or thickening (malignancies can be painful).**
- **Thickening or swelling that persist.**
- **Nipple pain or retraction.**
- **Nipple discharge.**
- **Breast skin irritation or dimpling.**

TRY TO AVOID THE Risk Factors for Breast Cancer:

- Weight Gain as an adult /obesity
- Estrogen & Progestin use
- Alcohol use

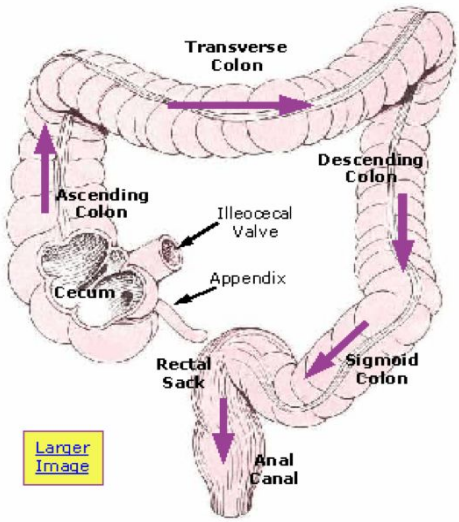
Treatment:

LOCAL: SURGERY, RADIOTHERAPY
SYSTEMIC: CHEMOTHERAPY, HORMONAL THERAPy, BIOLOGICAL THERAPY.

FNA =Fine needle aspiration

- **COLON CANCER**

- **The Colon is a long, coiled, tubular digestive tract**
- **It basically acts as a waste processor**
- **Takes digested food in the form of Solid waste pushing it out of the rectum and anus**
- **The Colorectal tube is a prime location for the development and growth of small polyps or tumors**



- **<u>Colon cancer risk factors:</u>**

- **Older <u>age</u>.** About 90 percent of people diagnosed with colon cancer are older than 50. Colon cancer can occur in younger people, but it occurs much less frequently.
- **A personal history of colorectal cancer or adenomatous polyps;** greater risk of colon cancer in the future (most probably detected when following with colonoscopy) These are premalignant lesions, but most do not develop into cancer.
- Villous adenomas have higher malignant potential than tubular adenomas.
- The larger the size, and the greater the number of polyps, the higher the risk of cancer.
- **Inflammatory intestinal conditions.** ulcerative colitis and Crohn's disease, can increase your risk of colon cancer (but UC poses a greater risk than Crohn disease)
- **Inherited syndromes that increase colon cancer risk.**. familial adenomatous polyposis and hereditary nonpolyposis colorectal cancer, which is also known as Lynch syndrome.
- **Family history of colon cancer and colon polyps:**
  - a. Multiple first-degree relatives with CRC.
  - b. Any first-degree relative diagnosed with CRC or adenoma under age 60.
- **Low-fiber, high-fat diet.**.
- **A sedentary lifestyle.**
- **Diabetes.** insulin resistance may have an increased risk of colon cancer.
- **Obesity.**
- **Constipation,** why? Stagnation of waists in colon, more bacteria that produce carcinogens that act on the epithelium, colon comes from glandular epithelium so they're always in the proliferation stage.
- **Smoking.** People who smoke cigarettes may have an increased risk of colon cancer.
- **Alcohol.** Heavy use of alcohol may increase your risk of colon cancer.
- **Radiation therapy for cancer**

- **Colon; The Cancer Itself:**
- **It starts with a simple cell the mutates in colon or rectum and grows into a polyps**
- **If a polyp is allowed to remain in the colon it can grow into a cancerous tumor that can invade other organs.**
- **Colon cancer is the second leading cause of cancer deaths**
- **Third most common cancer in the United States (in men and women)**
- **Virtually, all colorectal tumors arise from adenomas. Majority are endoluminal adenocarcinomas arising from the mucosa. Rarely, carcinoid tumors, lymphomas, and Kaposi sarcoma may be present but majority are adenocarcinomas .**

Symptoms of Colon Cancer presence of symptoms is typically a manifestation of relatively advanced disease

- A change in bowel habits, including diarrhea or constipation or a change in the consistency of your stool.
- Rectal bleeding or blood in your stool (melena or hematochezia).
- Persistent abdominal discomfort, such as cramps, gas or pain (most common presenting symptom), Can be caused by partial obstruction or peritoneal dissemination.
- A feeling that your bowel doesn't empty completely.
- Weakness or fatigue.
- Unexplained weight loss .
- **Unexplained iron deficiency anemia** (could be the only presentation, especially in postmenopausal women)

Clinical staging done with CT scan of chest, abdomen, and pelvis and by physical examination (ascites, hepatomegaly, lymphadenopathy)
Pattern of spread
Direct extension—circumferentially and then through the bowel wall to later invade other abdominoperineal organs
Hematogenous
• Portal circulation to liver—liver is most common site of distant spread
• Lumbar/vertebral veins to lungs
Lymphatic—regionally
Transperitoneal and intraluminal

Signs and symptoms based on specific location of tumor :

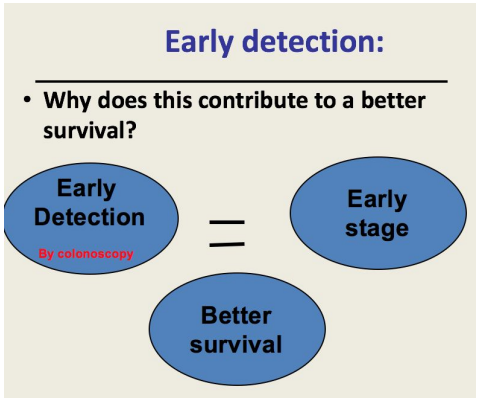
Right-sided tumors

- Obstruction is unusual because of the **larger luminal diameter** (the cecum has the largest luminal diameter of any part of the colon), allowing for large tumor growth to go undetected.
- Common findings: occult blood in stool, iron deficiency anemia, and **melena.**
- **Change in bowel habits is uncommon.**
- Triad of anemia, weakness, RLQ mass (occasionally) is present.

Left-sided tumors

- Smaller luminal diameter—signs of obstruction more common
- Change in bowel habits more common—alternating constipation/diarrhea;
- Narrowing of stools (“pencil stools”)
- Hematochezia more common

- **Treatment:**
- **Surgery is only curative treatment of CRC. Surgical resection of tumor-containing bowel as well as resection of regional lymphatics**
- **CEA level should be obtained before surgery (see below)**
- **Utility of adjuvant therapy (chemotherapy or radiation therapy) depends on stage**
- **of tumor and is beyond scope of this book**
- **Follow-up is important, and varies among physicians**
- **Stool guaiac test**
- **Annual CT scan of abdomen/pelvis and CXR for up to 5 years**
- **Colonoscopy at 1 year and then every 3 years**
- **CEA levels are checked periodically (every 3 to 6 months)**
- **A subsequent increase in CEA is a sensitive marker of recurrence**
- **Often, second-look operations are based on high CEA levels post resection • Very high elevations of CEA suggest liver involvement**
- **About 90% of recurrences occur within 3 years after surgery**



Early detection:
1- Colonoscopy.

2- Better imaging.

3- Better public and physician awareness.

More cases are diagnosed at earlier stage of disease.

Screening—refer to Chapter 12, Ambulatory Medicine

Fecal occult blood testing (FOBT) has poor sensitivity and specificity. Positive predictive value is only about 20%, but all patients with positive FOBT need a colonoscopy regardless

Digital rectal examination: Only about 10% of tumors are palpable by rectal examination

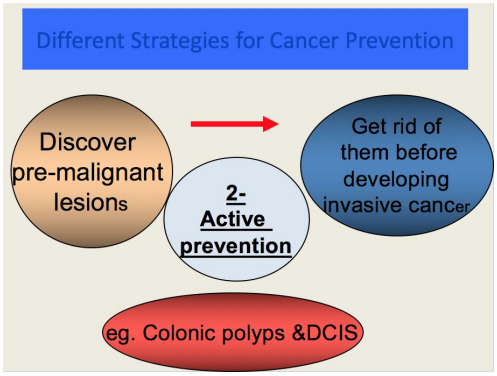
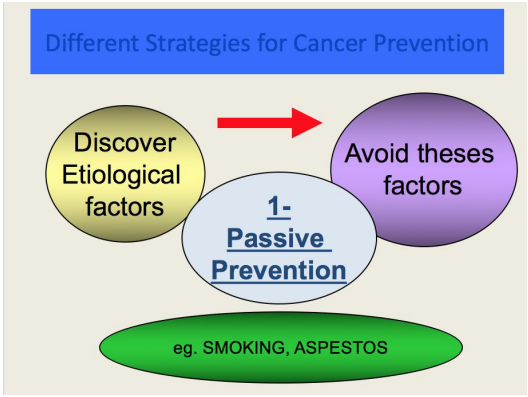
Colonoscopy

- **Most sensitive and specific test; the diagnostic study of choice for patients with a positive FOBT**
- **Diagnostic and therapeutic (e.g., biopsy, polypectomy)**
- **Flexible sigmoidoscopy**
- **Can be used to reach the area where approximately 50% to 70% of polyps and cancers occur (with a 60-cm scope)**
- **Can be diagnostic in about two-thirds of all colorectal cancers (CRCs)**
- **Barium enema**
- **Evaluates entire colon; complementary to flexible sigmoidoscopy**
- **Disadvantage is that any abnormal finding needs to be evaluated by colonoscopy**

Carcinoembryonic antigen (CEA)—not useful for screening; useful for establishing baseline, monitoring treatment efficacy, and recurrence surveillance. CEA does have prognostic significance: Patients with preoperative CEA >5 ng/mL have a worse prognosis

- **Prevention of colon CANCER?**

By avoiding risk factors such as smoking, Active prevention and Passive prevention.

Active prevention	Passive prevention
	
Active prevention: **Eliminate or prevent pre-invasive disease before invasion develops by chemo and surgery.**	**Passive prevention:** • **General health maintenance** • **Eat a healthy diet** • **Don't smoke** • **Don't drink too much** • **Exercise/ maintain optimal weight**

MCQs

Q1:An 18-year-old woman has a 2-cm, firm, rubbery mass in the upper outer quadrant of her left breast. It has been present for at least 3 or 4 months. The mass is easily movable, nontender, and otherwise asymptomatic. Which of the following is the most appropriate initial step in management?
(A) Clinical observation
(B) Sonogram
(C) Mammogram
(D) Incisional biopsy
(E) Excisional biopsy
Q2:A 24-year-old woman asks her physician about the possibility of genetic screening for BRCA1 mutations. Her mother died of breast carcinoma at age 44, and a sister had a diagnosis of in situ ductal carcinoma at age 38. Which of the following is the most appropriate advice to give this woman?
(A) Explain that BRCAl mutations are not associated with an increased risk of breast cancer
(B) Recommend screening only if she is of Ashkenazi Jewish descent
(C) Recommend counseling before genetic screening is undertaken
(D) Suggest prophylactic bilateral mastectomy instead of screening
Q3:A 21-year-old nulligravid woman comes to her physician to discuss birth control options. She became sexu- ally active for the first time 2 weeks ago. She is currently using condoms for contraception. Her past medical history is significant for asthma, which has been inactive for 2 years. She takes no medications and has no allergies to medications. She has no family history of cancer. Her examination is within normal limits. After a discussion with the physician, she chooses to take the oral contraceptive pill (OCP). She stays on the pill for the next 6 years. She now has most significantly increased her risk of developing which of the following malignancies?
(A) Breast cancer
(B) Cervical cancer
(C) Colon cancer
(D) Lung cancer
(E) Ovarian cancer
Q4:A 65-year-old man reports feeling increasingly tired and short of breath. He had been well until a year ago, when he started losing weight despite any dietary change. He also complains of pencil thin stools. His wife has commented that he seems very pale. He is on no medications. Physical examination shows a pale- appearing man with an elevated heart rate. Rectal examination is positive for occult blood. Laboratory studies are remarkable for a hematocrit of 25./.. lich of the following is the most appropriate next step in diagnosis?
(A) KUB (x-ray film showing the kidney, ureters and bladder)
(B) Colonoscopy
(c) Esophagoduodenoscopy
(D) Sigmoidoscopy
(E) Open laparotomy

Answers: 1.B,2.C,3.A,4.B

Thank you

If you have any question please contact with us at:
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