



Common Solid Tumors

Objectives:

- **pathological classification and staging of solid tumors**
- **Common solid tumors worldwide 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.**

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- [Editing file](#)
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★ Classification of solid tumors:

Malignant tumors are classified by the type of cell that the tumor cells presumed to be the origin of the tumor. These types include:

Carcinoma:

- Cancers derived from epithelial cells (either surface cells “for example, squamous cells” or glandular cells “give adenocarcinoma”).
- This group includes many of the most common cancers: breast, prostate, lung, pancreas, and colon.

Sarcoma:

- Cancers arising from connective tissue (i.e. bone, cartilage, fat, nerve).
- Each of which develop from cells originating in mesenchymal cells¹ outside the bone marrow.

Germ cell tumor:

- Cancers derived from pluripotent cells², most often presenting in the testicle or the ovary (seminoma and dysgerminoma, respectively).

Blastoma:

- Cancers derived from immature (precursor) cells or embryonic tissue.
- 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 (e.g. hepatoblastoma).

- ❑ 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 principles of solid tumors treatment:

Stage	Early	Locally advanced	Metastatic
Treatment	Local ± systemic to prevent chance of metastasis	Local & systemic	Systemic ± local just for palliation

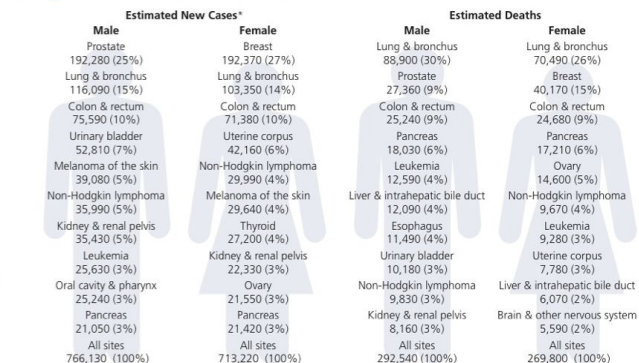
★ Common solid tumors:

In U.S (the three most common)	In KSA (The three most common)
Men: <ul style="list-style-type: none"> • prostate • lung • colorectal Women: <ul style="list-style-type: none"> • breast • Lung • Colorectal 	Men: <ul style="list-style-type: none"> • colorectal “most common” • Lymphoma (NHL) • Leukemia Women: <ul style="list-style-type: none"> • breast “most common” • Thyroid • colorectal

¹ multipotent stem cells that give rise to connective tissue cells.

² Stem cells that can give rise to all the cells that form the body.

Leading Sites of New Cancer Cases and Deaths – 2009 Estimates



*Excludes basal and squamous cell skin cancers and in situ carcinoma except urinary bladder.
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In U.S

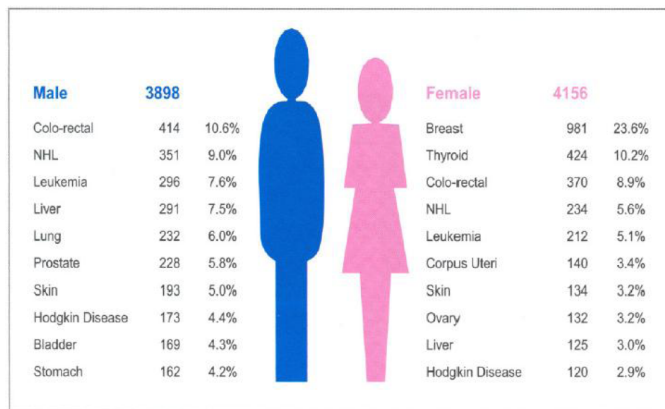


Figure 2.3 Ten Most Common Cancers among Saudis by Sex, 2006

In KSA

Breast Cancer

Epidemiology:

- 2nd most common cancer.
- 1st most common cancer in females.
- 2nd leading cause of death.
- Over 75% of women who are diagnosed with breast cancer are age 50 or older. in the west mostly 55 here it's 45
- Most women (about 80%) who get breast cancer do not have a sister or mother who has breast cancer.

There were 981 female breast cancer cases for year 2006. Breast cancer ranked first among females accounting for 23.6% of all newly diagnosed female cancers (4,156) in year 2006. The ASR was 18.1/100,000 for female population. The five regions with the highest

ASR were Eastern region at 25.0/100,000, Riyadh region at 22.6/100,000, Makkah region at 18.0/100,000, Madinah region at 17/100,000 and Tabuk region at 17/100,000. The median age at diagnosis was 47 years (Range 19-107 years).

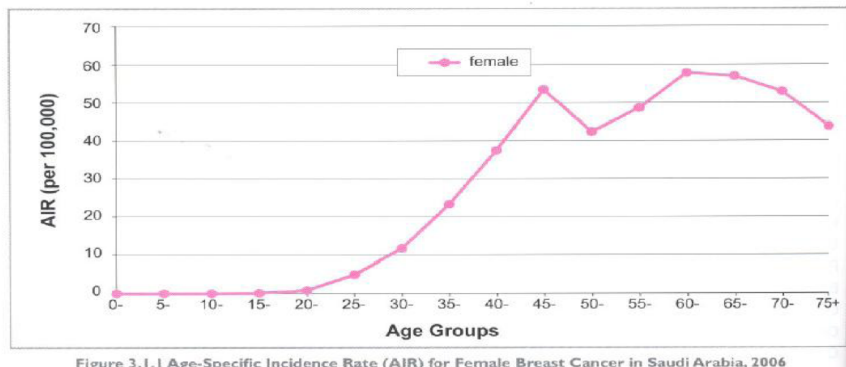


Figure 3.1.1 Age-Specific Incidence Rate (AIR) for Female Breast Cancer in Saudi Arabia, 2006

* AGE-SPECIFIC INCIDENCE RATE (AIR) FOR FEMALE BREAST CANCER IN SAUDI.

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★ Classifications of breast cancer:

Based on type of tissue	Based on invasiveness	Based on expression of proteins and genes (Important in treatment)
<ol style="list-style-type: none"> Ductal carcinoma. Lobular carcinoma. 	<ol style="list-style-type: none"> Non-invasive: <ol style="list-style-type: none"> Ductal carcinoma in situ (DCIS). Can be detected in mammography as calcification. Lobular carcinoma in situ (LCIS)⁴. Cannot be detected in mammography. Invasive: <ol style="list-style-type: none"> Invasive ductal carcinoma (the most common subtype of invasive carcinoma). Invasive lobular carcinoma. 	<ol style="list-style-type: none"> ER-positive. *ER: estrogen receptor. PR-Positive. *PR: progesterone receptor. HER2-positive.

³ "in the west the median age is 65, while here in Saudi it is 45"

⁴ DCIS and LCIS both can progress to invasive carcinoma, but LCIS unlike with DCIS, subsequent invasive carcinoma may arise in either breast.

★ Risk factors for breast cancer:

- Family history of breast cancer, especially in first-degree relatives.
- Benign breast diseases / atypical hyperplasia.
- Early menarche, late menopause. prolonged exposure to estrogen stimulates cell proliferation increasing the chance of mutations
- Late first pregnancy / no pregnancy.⁵
- Exogenous estrogens. "hormonal therapy"
- Personal hx, being overweight, excess fat intake, lack of breastfeeding, lack of physical activity, alcohol consumption.
- Radiation (HD). *radiation therapy for Hodgkin disease.
low radiation exposure is more dangerous than high radiation as high radiation kills the cell and does not allow it to mutate.

★ Good Breast Health Plan:

- Mammograms (for the asymptomatic).
- Self Awareness (Monthly Self Exams) (BSE).
- Physician awareness.

Remember Breast cancer :

- Is the most common cancer in females.
- Has a wide age range 20 - +70y.
- Breast cancer can occur during pregnancy, during lactation.
- Breast cancer can occur in pre, peri and postmenopausal females.

★ Clinical presentation: remember cancer is a mass that can invade locally and send distant metastases

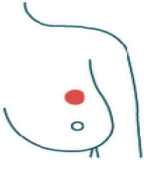
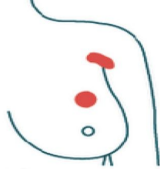

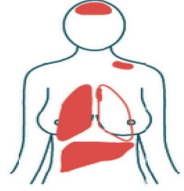
Warning signs and symptoms:

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

- ☐ Most women with symptomatic rather than screen-detected breast cancer present with a painless, increasing mass that may also be associated with nipple discharge, skin tethering, and/or ulceration.

⁵ multiple pregnancy & lactation are protective because the main hormone in pregnancy is progesterone "even though, cancer may develop in pregnant or lactating women"

★ **Breast cancer staging:**

Stage 1 (Early disease) more than 90% can be cured	Stage 2 (Early disease)	Stage 3 (Locally advanced)	Stage 4 (Advanced disease) less than 10% can be cured
Confined to the breast. (node-negative)	Spread to movable ipsilateral axillary node(s). (node-positive)	Spread to the superficial structures of the chest wall; involvement of ipsilateral internal mammary lymph nodes.	metastases present at distant sites such as bone, liver, lungs and brain and including supraclavicular lymph node involvement.
			

★ **Diagnostic strategies:**

Suspecting breast cancer is one of the most important steps in diagnosing early breast cancer.

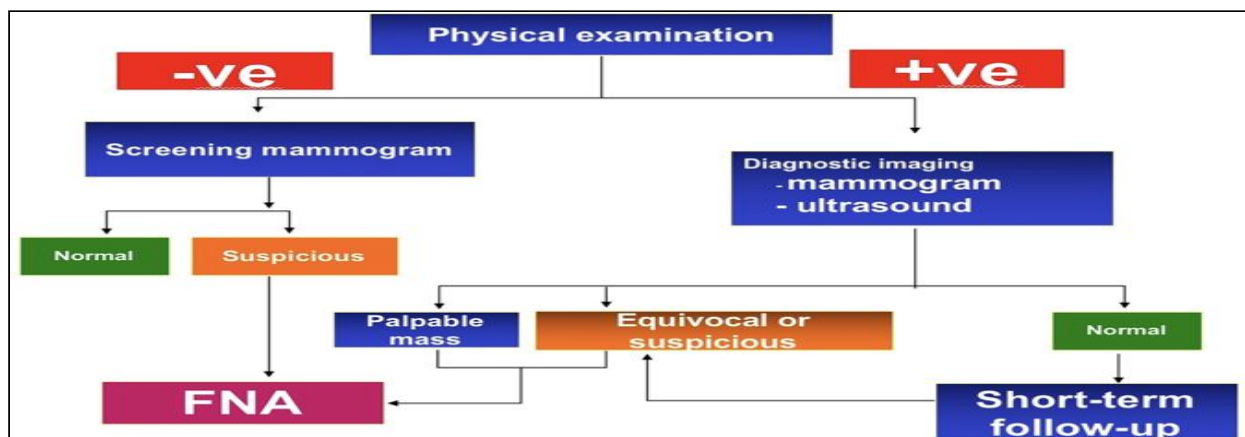
So what to do if you suspect breast cancer:

- Do not just reassure the patient.
- Do not give hormonal therapy. like tamoxifen and raloxifene it will shrink the tumor for a while but it will not cure it
- Do not give antibiotics. If breast abscess is suspected you can give antibiotics but you have to follow up
- Take a careful history.
- Perform careful physical exam.

★ **Diagnostic tests:**

- ★ Radiology (**mammography**, ultrasound). helpful in early detection, if she is young we do ultrasound if she's above 40 or 45 we do mammogram.
- ★ FNA (Fine needle aspiration). To differentiate between benign and malignant.
- ★ Core biopsy. To provide the grade, proliferation index (Ki-67), and to test for ER, PR and HER2/neu.
- ★ Open biopsy.

IMP.PICTURE!



★ Management:

Local therapy:

if early we start with:

- ❖ Surgery. (Mastectomy or breast-conserving surgery)
- followed by:**
- ❖ Radiotherapy.

Systemic therapy:

- ❖ Chemotherapy.
- ❖ Hormonal therapy.
- ❖ Biological therapy.

★ Prognosis:

- **5 years survival:** (image)
 - 90% in stage 1.
 - <10% in stage 4.

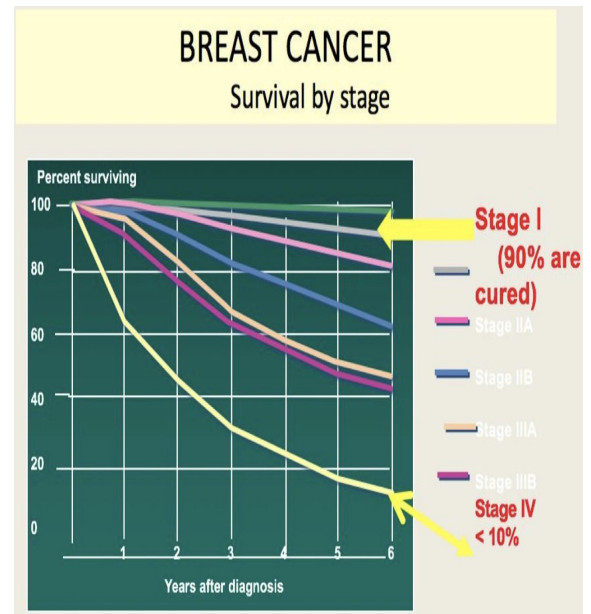
So the earlier detection of breast cancer will lead to longer survival and vice versa.

- **Late Presentation + Advanced Stage = Poor Outcome**
- **Early Presentation+ Early Stage= Good Outcome**

So: early diagnosis + early and proper intervention = good prognosis.

predictors of a high risk of recurrence:

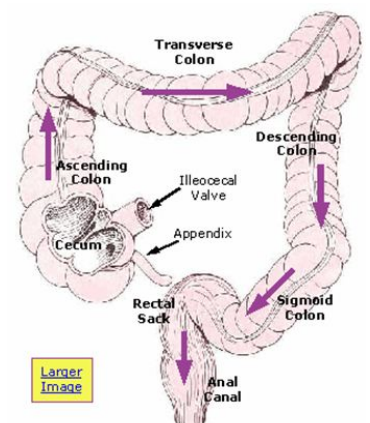
- large size of the primary tumor.
- High-grade/poorly differentiated tumor.
- Estrogen, progesterone(ER, PR), and HER2 receptor -negative.
- young age and pre-menopausal status.



Colon Cancer

The Colon:

- 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.



Colon Cancer:

- It can affect any part of the colon: cecum, ascending, descending, or sigmoid.
- Colon cancer is the second leading cause of cancer deaths
- 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.
- It starts with a simple cell that mutates and grows into polyps.
- If a polyp is allowed to remain in the colon it can grow into a cancerous tumor that can invade other organs.

★ **Risk factors of colon cancer:**

- Older age:
 - About 90 percent of people diagnosed with colon cancer are older than 50. (it can occur in younger people, but it occurs much less frequently)
- A personal history of colorectal cancer or polyps (even if it was non-cancerous polyps):
 - If you've already had colon cancer or adenomatous polyps, you have a greater risk of colon cancer in the future.
- Inflammatory intestinal conditions:
 - ulcerative colitis and Crohn's disease can increase your risk of colon cancer. (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:
 - you're more likely to develop colon cancer if you have a parent, sibling or child with the disease.
 - If more than one family member has colon cancer or rectal cancer, your risk is even greater.
- Chronic Constipation:
 - Stagnation of wastes in colon, allows the bacteria to act on these waste and produce carcinogens that affect the lining mucosa (epithelium) of the large intestine leading to colonic polyps and cancer.
 - colon comes from glandular epithelium so they're always in the proliferation stage.
- Low-fiber, high fat diet.
- A sedentary lifestyle.
- Diabetes mellitus Type 2 -insulin resistance-, Obesity, Smoking, Alcohol.
- Radiation therapy for other cancers.
- have had some other type of cancer.

★ **Symptoms of Colon Cancer:**

- mass that can invade and send metastases
- A change in bowel habits, including diarrhea or constipation, or a change in the consistency of the stool.
- Rectal bleeding or blood in the stool, not melena. Melena is digested blood.
- Persistent abdominal discomfort (such as cramps, gas or pain).

★ **Symptoms can also be vague :**

- Unexplained weight loss.
- Weakness or fatigue.
- Unexplained iron deficiency anemia. important (could be the only presentation).

Taken from Step Up: Signs and symptoms based on specific location of the tumor

1. 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

2. 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

3. Rectal cancer (20% to 30% of all CRCs):

- Hematochezia—most common symptom.
- Tenesmus.
- Rectal mass; feeling of incomplete evacuation of stool (due to mass).

★ **Colon cancer diagnosis:**

1. endoscopic biopsy.
2. CT chest abdomen and pelvis.

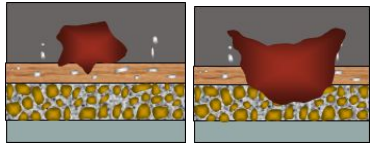
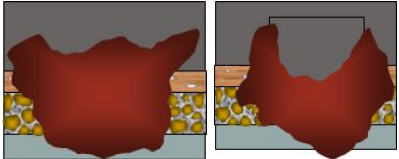

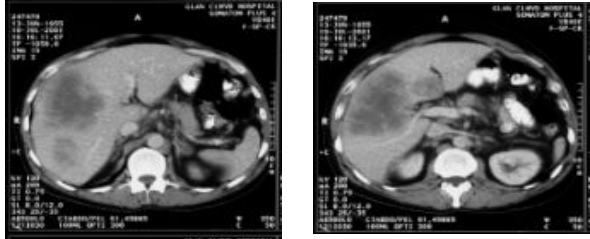
★ **Investigations:**

Early Detection of colon Cancer → Early Stage → Better Chances of survival.

- Colonoscopy
- Better imaging
- Better public and physician awareness.
- All these together will lead to more cases diagnosed at earlier stage of disease.

★ **Colon cancer stages:**

all colon cancers start as polyps (adenoma) > adenoma hyperplasia > mutation > full cancer

<p>Stage 1 (early colon cancer) 5 year OS⁶ = 90%</p>	<p>limited to the layers of the colon wall all colon cancers start as polyps.</p>	
<p>Stage 2 5 year OS = 60-80%</p>	<p>Beyond the wall (has grown to nearby tissue, but didn't involve nearby lymph nodes yet)</p>	
<p>Stage 3 (locally advanced) 5 year OS = 30-60%</p>	<p>has grown to nearby lymph nodes</p>	
<p>Stage 4 (metastasized) 5 year OS = <5%</p>	<p>colon cancer may metastasize to liver or lung.</p>	

★ **Treatment:**

Taken From Kumar:

- Surgery is only curative treatment of CRC.
- Surgical resection of tumor-containing bowel as well as resection of regional lymphatics.

Note: radiotherapy is not helpful for colonic cancers proximal to the rectum because of difficulties delivering a sufficient dose to the tumour without excess toxicity to adjacent structures.

⁶ The length of time from either the date of diagnosis or the start of treatment for a disease, such as cancer, that patients diagnosed with the disease are still alive (survival).

★ **Follow-up:**

Taken From Step UP :

Follow-up is important, and varies among physicians

- A. Stool guaiac test.
- B. Annual CT scan of abdomen/pelvis and CXR for up to 5 years.
- C. Colonoscopy at 1 year and then every 3 years.
- D. CEA levels are checked periodically (every 3 to 6 months)
- E. About 90% of recurrences occur within 3 years after surgery.

★ **Prevention of Colon and Breast Cancers:**

There are different strategies for cancer prevention:

1-Passive Prevention. (Not good enough In high risk people)

2-Active Prevention. *give medication like tamoxifen in breast cancer*

Passive Prevention	Active Prevention
<p>Discover Etiological factors</p> <p>↓</p> <p>Avoid these factors</p> <p>eg. Smoking, Asbestosis, obesity, Alcohol use <i>constipation for colon cancer</i> , Estrogen & Progestin use for Breast cancer.</p> <hr/> <p>General health maintenance:</p> <ul style="list-style-type: none"> ● Eat a healthy diet, social change is difficult and takes a long time and improve your habits . ● Don't smoke ● Don't drink ● Exercise/ maintain optimal weight 	<p>Discover pre-malignant lesions</p> <p>↓</p> <p>Get rid of them before developing invasive cancer</p> <p>eg. Colonic polyps & DCIS (<i>Ductal Carcinoma in Situ</i>)</p> <hr/> <p>Eliminate or prevent pre-invasive disease before invasion develops:</p> <ul style="list-style-type: none"> ● Chemoprevention ● Surgery

Summary

Common Solid tumours		
the most common solid tumours in KSA are: Breast cancer in women and Colorectal in men.		
	Breast cancer	Colon cancer
Risk factors	<ul style="list-style-type: none"> ● Family history. ● Benign breast diseases ● Early menarche or late menopause. ● Late first pregnancy / no pregnancy. ● Exogenous estrogens.. ● Radiation (HD). 	<ul style="list-style-type: none"> ● Older age ● personal history ● Family history ● Inflammatory intestinal conditions ● Inherited syndromes ● Chronic Constipation
Clinical manifestations	<ul style="list-style-type: none"> ● Painless lump ● thickening or swelling ● nipple pain or retraction ● nipple discharge. ● breast skin irritation or dimpling. 	<ul style="list-style-type: none"> ● A change in bowel habits, ● Rectal bleeding ● Persistent abdominal discomfort
Investigations	<ul style="list-style-type: none"> ★ Radiology (mammography, ultrasound). ★ FNA (Fine needle aspiration). ★ Core biopsy. ★ Open biopsy. 	<ul style="list-style-type: none"> ★ Colonoscopy ★ endoscopic biopsy. ★ mCT chest abdomen and pelvis.
Management	<p>Local therapy:</p> <ul style="list-style-type: none"> ❖ Surgery. ❖ Radiotherapy. <p>Systemic therapy:</p> <ul style="list-style-type: none"> ❖ Chemotherapy. ❖ Hormonal therapy. ❖ Biological therapy. 	<ul style="list-style-type: none"> ❖ Total mesorectal excision (TME). ❖ A segmental resection. ❖ Local transanal surgery. ❖ Adjuvant postoperative chemotherapy.
Prevention	Active & passive	

Questions

1. what is the most common location for colon cancer metastasis ?

- A. brain
- B. bone
- C. liver
- D. lung

2. which one of the following is considered as active prevention ?

- A. estrogen and progestin use for breast cancer
- B. avoid constipation for colon cancer
- C. avoid smoking for lung cancer
- D. tamoxifen for breast cancer

3. 55 years old man came with change in bowel habits and narrowing of stools after investigation he diagnosed with colon cancer, which part of colon affected ?

- A. left side
- B. right side
- C. sigmoid
- D. rectum

4. what is the best modality for colon cancer diagnosis ?

- A. X-ray
- B. colonoscopy
- C. serum carcinoembryonic antigen (CEA)
- D. MRI

5. 22 years old lady presented to the clinic after she noticed a lump while she's having a shower, her sister had died four months ago of breast cancer, on physical examination no findings were observed, what will you do next ?

- A. Reassure the patient and send her home
- B. Screen with mammography
- C. start her on tamoxifen
- D. Screen with ultrasound

6. which of the following is more prone to develop breast cancer ?

- A. A lady who had her first child at 19 years old
- B. A lady with pulmonary TB doing multiple CXR follow ups
- C. A lady with 6 daughters and 5 sons
- D. A lady with lung cancer undergoing extensive radiotherapy

7. 43 years old lady came to you complaining of a lump on her upper outer breast that she noticed 10 days ago ,after taking history and performing PE you suspected breast cancer, mammogram was done and FNA confirmed the malignancy, further scans for metastasis were negative and the mass appears to be localized to that area of the breast, what would you suggest as the best management plan for the patient?

- A. Surgical intervention
- B. Start her on tamoxifen
- C. Chemotherapy
- D. Radiotherapy

8. years old woman came to the clinic complaining about a mass in her left breast, after examination of the breast there was no clinical finding (the breast is normal).

What should you do?

- A. Reassure the patient and give a follow-up appointment after one year
- B. Ultrasound and mammogram
- C. Blood test
- D. Do genetic study braca

9. years old pregnant female in her 6 months of pregnancy came to the clinic complaining of right nipple retraction. Breast examination revealed normal breast, no masses and no lymph nodes enlargement, except retraction of right nipple. What is your appropriate next step?

- A. Biopsy from right nipple
- B. Perform ultrasound of breast immediately
- C. Perform mammogram and ultrasound of breast after delivery
- D. Reassure and close follow up

answer:

- 1:C
- 2:D
- 3:A
- 4:B
- 5:D
- 6:B
- 7.A
- 8.B
- 9.B