



433 Teams

MEDICINE

3|Introduction to Cancer
Diagnosis And Treatment



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Objectives:

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| 1. Definition of cancer |
| 2. Know the etiology of cancer |
| 3. Describe the Staging of malignant diseases. |
| 4. Know the principles of pathological classification of malignant diseases. |
| 5. Describe the general symptoms and signs of malignancy. |
| 6. Know the principles of cancer management (curative Vs Palliative concept). |



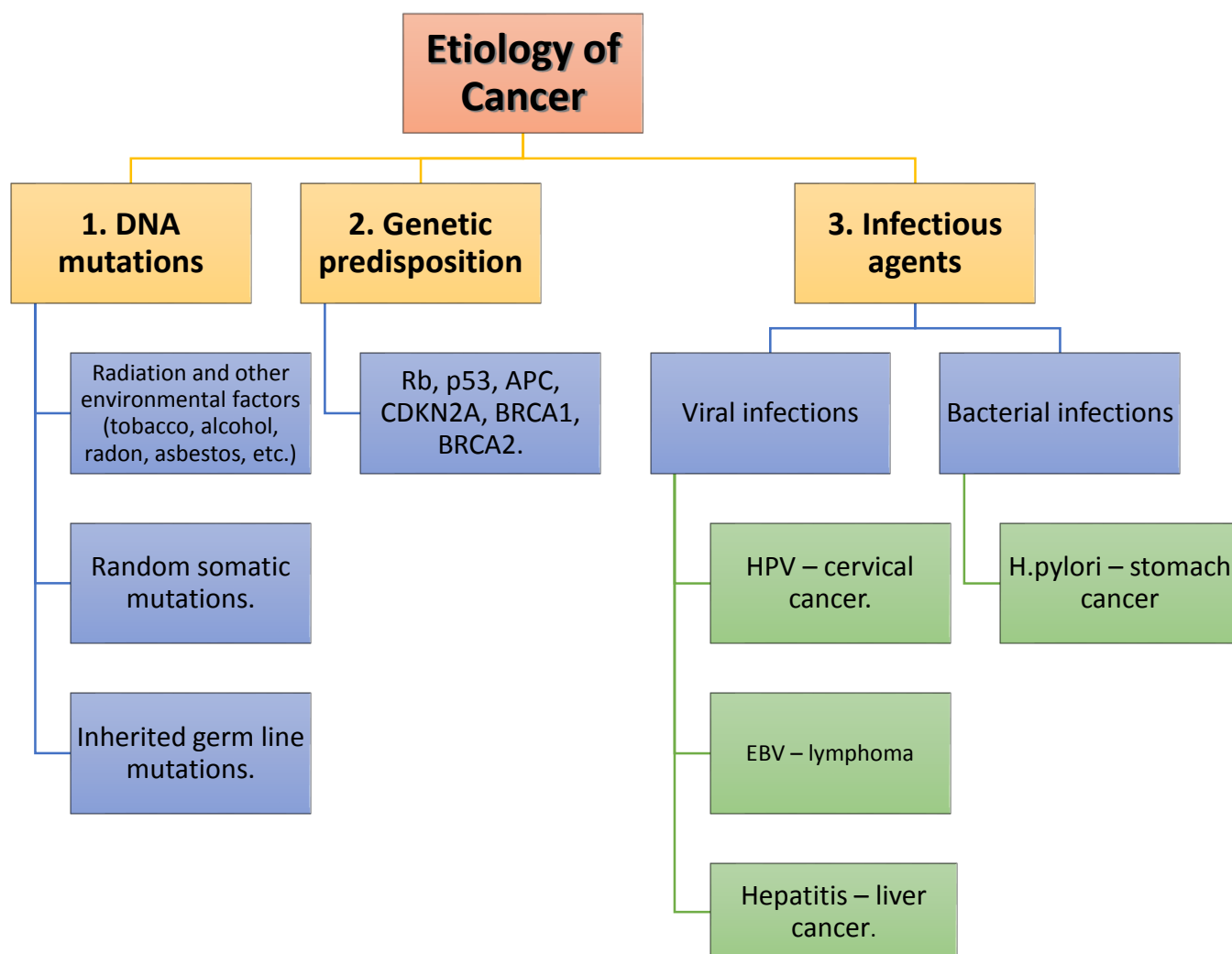
Definition of Cancer

Cancer is a term used for diseases in which **abnormal cells divide** and **escape the body's control**. These cells are able to:

- Invade surrounding tissues.
- Send distant metastases.
- Lose their functions.

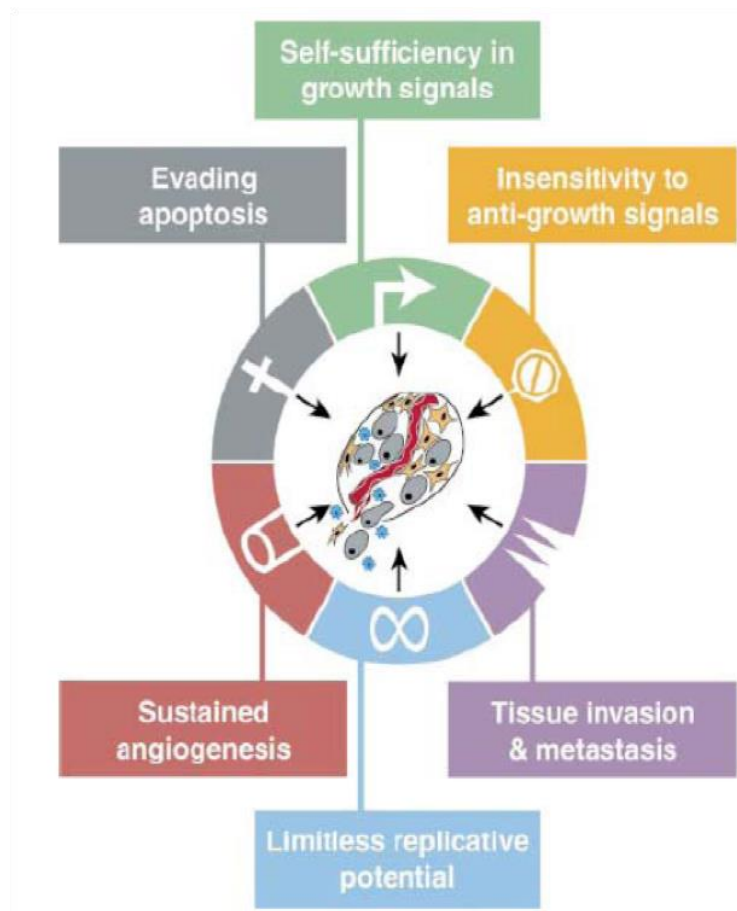
Etiology of Cancer

Cancer arises from the **mutation** of a normal gene; mutated genes that cause cancer are called **oncogenes**.



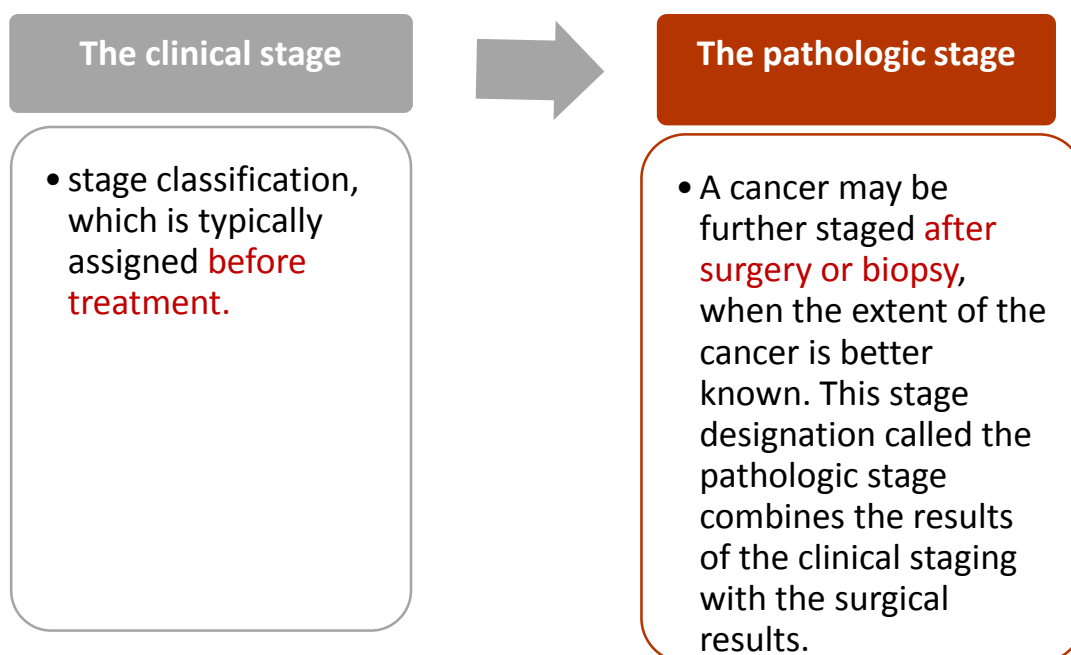
NOTE

The doctor mention immune depression one of the cancer's cause Immune depression could be:
Viral, Bacterial (e.g.: H. Pylori), Drugs (e.g.: steroid), Immune deficiency syndrome (genetic)



Staging of Malignant Diseases

Staging describes the severity of a person's cancer based on the size and/or extent (reach) of the original (primary) tumor and whether or not it has spread in the body. All cancers are staged when they are first diagnosed.





Important

TNM system: The TNM system is **based on:**

- the size and/or the extent (reach) of the primary tumor

T



- the amount of **spread to nearby lymph nodes**

N



- the **presence of metastasis (M)** or secondary tumors formed by the spread of cancer cells to other parts of the body.

M



<u>Primary Tumor (T)</u>	<u>Regional Lymph Nodes (N)</u>	<u>Distant Metastasis (M)</u>
<ul style="list-style-type: none"> • _TX: Primary tumor cannot be evaluated. • T0: No evidence of primary tumor. • Tis: Carcinoma in situ. • T1, T2, T3, T4: Size and/or extent of the primary tumor. 	<ul style="list-style-type: none"> • NX: Regional lymph nodes cannot be evaluated. • N0: No regional lymph node involvement. • N1, N2, N3: Degree of regional lymph node involvement. 	<ul style="list-style-type: none"> • MX: Distant metastasis cannot be evaluated • M0: No distant metastasis • M1: Distant metastasis is present

Staging source: <http://www.cancer.gov/about-cancer/diagnosis-staging/staging/staging-fact-sheet>

Primary tumors vs. metastatic tumors:

Primary Tumors:
represent de novo
tumors in their
initial site.

Metastatic Tumors:
Originate from the
distant growth of the
primary tumors.

What types of tests are used to determine stage?

Physical exam: the physical exam may show the location and size of the tumor(s) and the spread of the cancer to the lymph nodes and/or to the tissues and organs.

Imaging studies: x-rays, CT scans, and MRI scans can show the location of the cancer, the size of the tumor, and whether the cancer has spread.

Laboratory tests.

Pathology reports: provides information about the size of the tumor, the growth of the tumor into other tissues and organs, the type of cancer cells, and the grade. These informations could be provided by a biopsy.

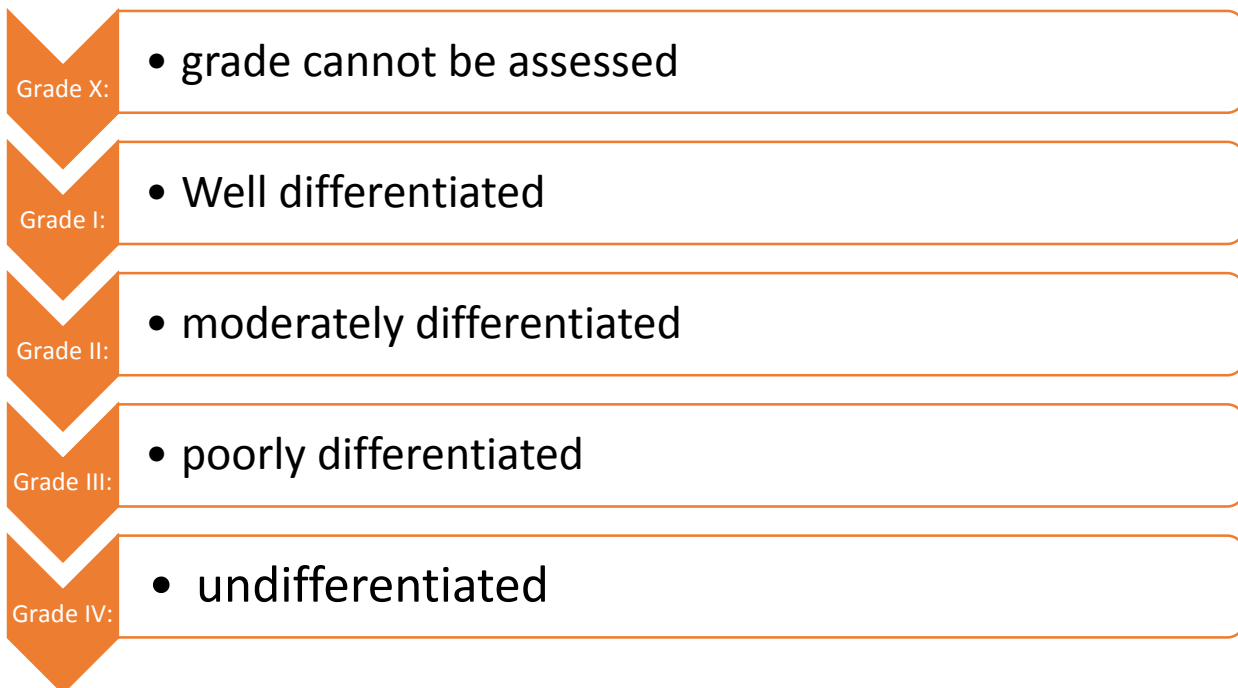
Surgical reports.

What is tumor grade? (EXTRA)

Tumor grade is the description of a tumor based on how abnormal the tumor cells and the tumor tissue look under a microscope. It is an indicator of how quickly a tumor is likely to grow and spread.

If the cells of the tumor and the organization of the tumor's tissue are close to those of normal cells and tissue, the tumor is called "well-differentiated". These tumors tend to grow and spread at a slower rate than tumors that are "undifferentiated" or "poorly differentiated", which have abnormal-looking cells and may lack normal tissue structures. The factors used to determine tumor grade can vary between different types of cancer.

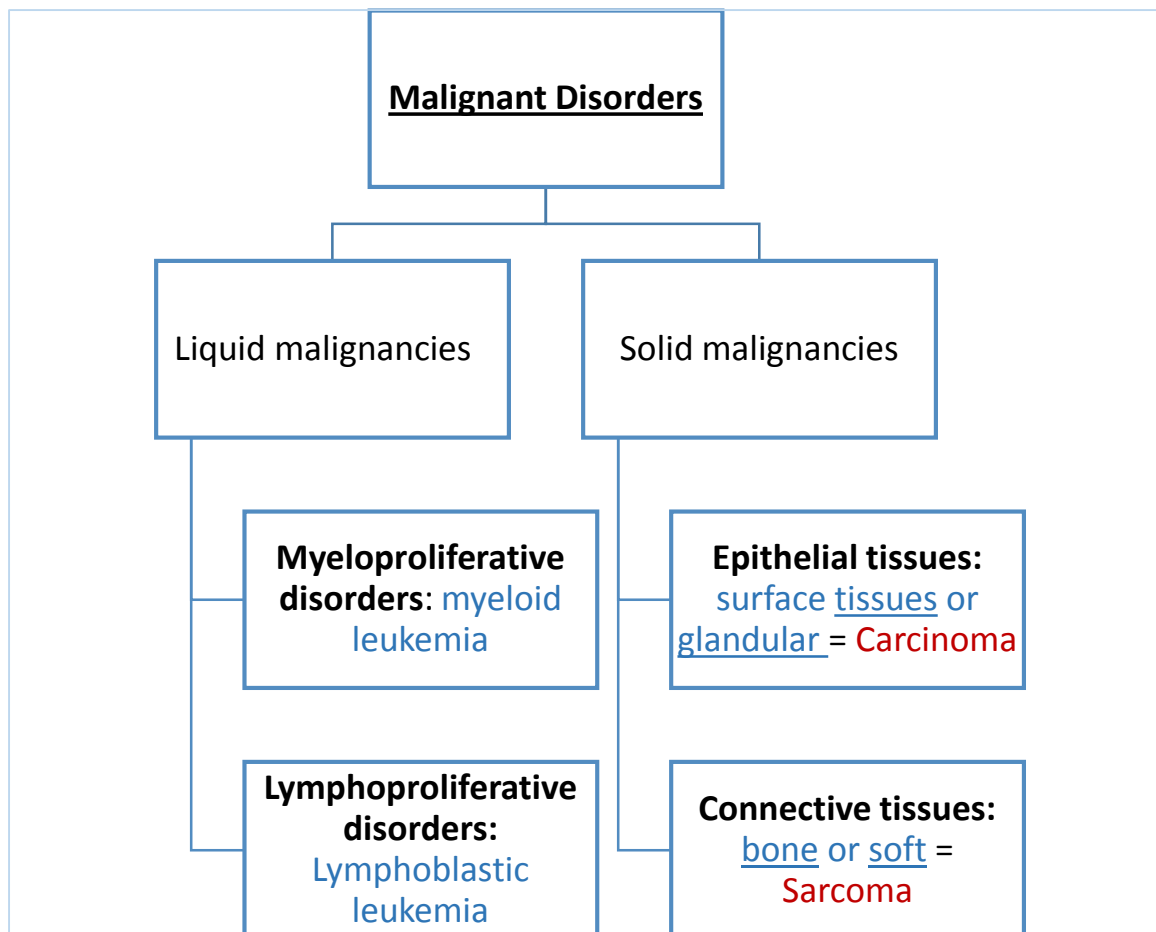
Tumor grading:



<http://www.cancer.gov/about-cancer/diagnosis-staging/prognosis/tumor-grade-fact-sheet> **Source**

Principles of Pathological Classification of Malignant Disease:

Categories of Malignant Disorders:



General Signs and Symptoms of Malignancy:

Cancer gives most people **no symptoms or signs that exclusively indicate the disease**. Unfortunately, every complaint or symptom of cancer can be explained by harmless condition as well.

The clues are: **persistent, progressive, and disabling signs*** and **symptoms**. They change according to the site of origin, so you should think about the pathology and site: e.g. mass that is able to invade locally and spread distantly.

Constitutional symptoms: **fatigue, fever, sweating, and weight loss**.

NOTE

Disabling mean: symptom affect your life

ضرب مثال قال لو صداع مراح يكون صداع عادي راح يكون صداع قوي ومستمر لمدة طويله

Principles of Cancer Management:

We have to determine the treatment objective:

CURATIVE OR PALLIATIVE

The aim of cancer treatment is to cure cancer if possible OR control the symptoms and improve the patient's survival if not curable.

Anticancer therapy may be either **curative** (to cure the disease) or **palliative** (control symptoms and improve survival) and this distinction influences the approach to management of individual patients.

Palliation: the aim of palliative chemotherapy is to produce and improve the quality of life with a minimized impact of toxicity on the patient; there may be a small increase in survival

-**Palliative therapy:** is simple, short term, acute, and less toxic.

-**Curative therapy:** is aggressive, expensive, and complex and has long-term toxicity.

Adjuvant treatment: administered **after surgery** and its aim is to increase the disease-free and overall survival.

Neoadjuvant treatment: patients receive chemotherapy, radiotherapy, or hormonal therapy **before surgery.**

Overall Approach to Cancer Management:

Three main questions to consider are:

1. What is the type of cancer?

In most cases, this requires a tissue diagnosis. In modern oncology, it is unusual or inappropriate to start treatment based on clinical diagnosis alone without tissue diagnosis. Tissue diagnosis is also important to perform molecular studies to select appropriate targeted therapies.

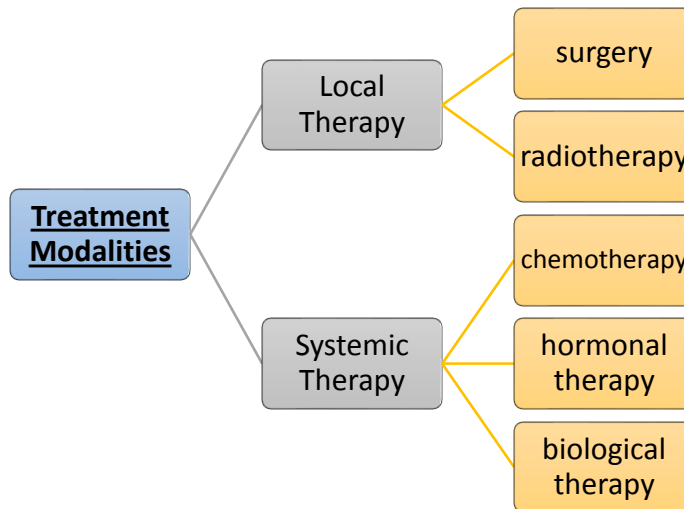
2. What is the extent of the spread of the cancer?

This is answered by staging scans including CT scans, bone scans and PET scans.

3. Is it curable or not curable?

This depends on the type of cancer and the presence or absence of and the extent of metastasis.

Different Treatment Modalities:



What is the patient's prognosis?

The prognosis depends on:

1. The cancer type and extent (stage).
2. The patient factors (age, sex, co-morbidities)
3. The available tools.

1- Tumors that can be cured:

- lymphomas, leukemia, early solid tumors

2- Tumors that can have prolonged survival:

- Locally advanced and some of
- the metastatic tumors

3- Tumors that can be palliated:

- Metastatic solid tumors

MCQs:

1- 69-year-old African American man presents with weight loss and back pain. Over the past 2 months he has developed hyperglycemia with a fasting glucose of 153 mg/dL. He does not have nocturia. His appetite is decreased; he has noticed mild constipation. The back pain is constant and keeps him awake at night. On examination he appears cachectic and pale. He does not have scleral icterus. Laboratory studies reveal a mild normochromic anemia. Liver and kidney function studies are normal.

What diagnostic study is most likely to reveal the cause of his symptoms?

- a. CT scan of the abdomen with IV contrast
- b. Glucose tolerance test
- c. Colonoscopy
- d. Stool studies for malabsorption
- e. Whole-body PET scan

2- A 19-year-old woman presents for evaluation of a non-tender left axillary lymph node. She is asymptomatic and denies weight loss or night sweats. Examination reveals three rubbery firm non-tender nodes in the axilla, the largest 3 cm in diameter. No other lymphadenopathy is noted; the spleen is not enlarged. Lymph node biopsy, however, reveals mixed-cellularity Hodgkin lymphoma. Liver function tests are normal.

Which of the following is the best next step in evaluation?

- a. Bone marrow biopsy
- b. Liver biopsy
- c. Staging laparotomy
- d. Erythrocyte sedimentation rate
- e. CT scan of chest, abdomen, and pelvis

3- A 60-year-old man presents with dull aching pain in the right flank. Physical examination reveals a firm mass that does not move with inspiration. Laboratory studies show normal BUN, creatinine, and electrolytes. UA shows hematuria. Hemoglobin is elevated at 18 g/dL and serum calcium is 11 mg/dL.

What is the most likely diagnosis?

- a. Polycystic kidney disease
- b. Pheochromocytoma
- c. Adrenal carcinoma
- d. Renal adenomyolipoma
- e. Renal cell carcinoma

4- A 64-year-old woman who is receiving chemotherapy for metastatic breast cancer has been treating mid thoracic pain with acetaminophen. Over the past few days she has become weak and unsteady on her feet. On the day of admission, she develops urinary incontinence. Physical examination reveals fist percussion tenderness over T8 and moderate symmetric muscle weakness in the legs. Anal sphincter tone is reduced.

Which of the following diagnostic studies is most important to order?

- a. Serum calcium
- b. Bone scan
- c. Plain radiographs of the thoracic spine
- d. MRI scan of the spine
- e. Electromyogram with nerve conduction studies

5- A 37-year-old woman presents for evaluation of a self-discovered breast mass. There is no family history of breast cancer; she is otherwise healthy. Examination reveals a 1.5-cm area of firmness in the right upper outer quadrant. No skin changes are noted. You attempt to aspirate the mass, but no fluid is obtained; a mammogram is ordered and is normal.

Which of the following is the most appropriate next step in management?

- a. Refer the patient for further evaluation to a surgeon or comprehensive breast radiologist.
- b. Reevaluate the patient in 6 months.
- c. Give oral contraceptives to decrease ovulation and help shrink the lesion.
- d. Recommend tamoxifen to decrease her chance of developing cancer.
- e. Reassure the patient.



Answers: 1- A 2-E 3- E 4- D 5- A

1- The answer is a. Anorexia, weight loss, and back pain are common presenting symptoms of adenocarcinoma of the pancreas. Some patients present with new-onset diabetes. Although diabetes itself can cause weight loss, this would usually be associated with nocturia. Polyphagia rather than anorexia would characterize the weight loss of diabetes and malabsorption. In this patient, a CT scan would likely show a mass in the pancreas. Although cancer in the head of the pancreas can present with obstructive jaundice, cancer of the body or tail of the pancreas is often associated with normal liver enzymes. This patient's symptoms are not suggestive of colon cancer, and the anemia associated with colon cancer is usually microcytic. Although PET scan may be used to stage certain cancers, it is rarely indicated as an initial test when cancer is suspected. Malabsorption is associated with diarrhea, not constipation. A glucose tolerance test will not add to the evaluation of this patient with known diabetes.

2- The answer is e. The staging of Hodgkin disease is important so that proper treatment can be planned. Stage I (single lymph node bearing area) or stage II (more than one lymph node site on the same side of the diaphragm) patients with good prognostic features may be treated with radiation therapy. Those with stage III (affected lymph nodes on both sides of the diaphragm) or stage IV (extranodal disease) are treated with combination chemotherapy. CT or MRI of the abdomen and pelvis will show evidence of lymph node involvement below the diaphragm. Staging laparotomy with splenectomy, formerly done to provide pathology of the periaortic nodes and spleen, is rarely done today. Gallium scans can be useful in difficult cases. Bone marrow biopsy can later be performed to exclude bone marrow disease, which would imply stage IV, if less invasive studies have not clarified the proper stage. Liver biopsy is rarely indicated and the ESR is a nonspecific test.

3- The answer is e. Renal cell carcinoma is twice as common in men as women and tends to occur in the 50- to 70-year age group. Many patients present with hematuria or flank pain, but the classic triad of hematuria, flank pain, and a palpable flank mass occurs in only 10% to 20% of patients. Paraneoplastic syndromes such as erythrocytosis, hypercalcemia, hepatic dysfunction, and fever of unknown origin are common. Surgery is the only potentially curable therapy; the results of treatment with chemotherapy or radiation therapy for nonresectable disease have been disappointing. Interferonalpha and interleukin-2 produce responses (but no cures) in 10% to 20% of patients. Newer tyrosine kinase inhibitors (eg, sunitinib) are active against renal cell cancers and hold promise for more effective treatment. The prognosis for metastatic renal cell carcinoma is dismal. Pheochromocytoma can cause erythrocytosis and occasionally hypercalcemia but would not cause hematuria or an intrarenal mass. Polycystic kidney disease can cause erythrocytosis because of erythropoietin production by the cysts but would cause numerous bilateral cysts, not a solid mass. Renal adenomyolipoma is a benign tumor that can present as a solitary renal mass on ultrasound. It has a characteristic CT appearance due to fat in the tumor. Neither renal adenomyolipoma nor adrenal carcinoma would cause erythrocytosis or hypercalcemia.

4- The answer is d. Spinal cord compression is an oncologic emergency. Major neurological deficit is often irreversible and severely compromises the patient's remaining quality of life. Vertebral and then epidural involvement precede the neurological findings; the thoracic cord is involved 70% of the time. The patient is often given high-dose dexamethasone before being sent for MRI. In the presence of neurological compromise, the definitive test, MRI scan, should be performed as quickly as possible. Multiple epidural metastases are noted in 25% of patients; their presence can affect treatment (eg, the extent of radiation therapy fields). If no neurological abnormalities are present, most experts recommend plain radiographs of the painful vertebra as the initial diagnostic test. A radionuclide bone scan would reveal the vertebral involvement but would not show the degree of spinal cord compromise. Electromyogram and nerve conduction studies would be normal in spinal cord disease. Bone scan and thoracic spine films are less specific than MRI. Hypercalcemia might cause confusion but not spinal cord signs.

5- The answer is a. A breast mass, even in a young woman, requires definitive evaluation. Although most such masses are benign, breast cancer is still the most common cause of cancer death in this age group. Risk factor assessment cannot provide sufficient reassurance. A negative mammogram never rules out breast cancer. **Either excisional biopsy or, in selected hands, fine-needle aspiration with follow-up, will be needed to detect cases of breast cancer before metastases outside the breast have occurred. Reassurance and reevaluation in 6 months may lead to delay in diagnosis of breast cancer.** Neither oral contraceptives nor tamoxifen are indicated prior to a definitive diagnosis.

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