



Cancer treatment

by “Dr. Abdulrhman Al-Thiyab “

GBGZ

Objective of the lecture:

Identify the different modality of cancer therapy

Modalities of treatment:

1-local therapy:

- ✓ surgery.
- ✓ radiation therapy.

2-systemic treatment:

- ✓ Chemotherapy.
- ✓ Hormonal therapy.
- ✓ Monoclonal antibodies.
- ✓ Radioactive material.

3-supportive care.

4-non-conventional therapy.

Surgery:

- Surgery was the first modality used successfully in the treatment of cancer.
- It is the only curative therapy for many common solid tumors. The most important determinant of a successful surgical therapy is the absence of distant metastases and no local infiltration.
- surgery (applicable to all solid tumors, but not haematological)
- Microscopic invasion of surrounding normal tissue will necessitate multiple frozen sections.
- Resection or sampling of regional lymph node is usually indicated.
- Surgery may be used for palliation in patients for whom cure is not possible.
- Has significant role in cancer prevention.
- E.g. familial polyposis coli.

NOTE:

- Breast lump :ct lung ,abdomen, bone scan
US of liver → 20%
chance of missing liver lesion

Surgery for prevention:

Patients with conditions that predispose them to certain cancers or with genetic traits associated with cancer can have normal life span with prophylactic surgery...



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- ✓ colectomy .
- ✓ oophorectomy.
- ✓ thyroidectomy.
- ✓ removal of premalignant skin lesion.

Radiation therapy:

- Radiation therapy: is a local modality used in the treatment of cancer.
- Success depends in the difference in the radio sensitivity between the tumor and normal tissue.
- It involves the administration of ionizing radiation in the form of x-ray or gamma rays to the tumor site.

Method of delivery:

External beam (teletherapy).

Internal beam therapy (Brachytherapy).

- Radiation therapy is planned and performed by a team of nurses, dosimetrists, and physician and radiation oncologist.

A course of radiation therapy is preceded by a simulation session in which low-energy beam are used to produce radiographic images that indicate the exact beam location.

- Radiation therapy is usually delivered in fractionated doses such as 180 to 300 cGy per day, five times a week for a total course of 5-8 weeks.

- Radiation therapy with curative intent is the main treatment in limited stage Hodgkin's disease, some NHL, limited stage ca prostate, gynecologic tumors&CNS tumor.

-Also can use in palliative &emergency setting

Complication of radiation:

- There are two types of toxicity, acute and long term toxicity.
- *Systemic symptoms*: such as Fatigue, local skin reaction, I toxicity, oropharyngeal mucositis&xerostomia.myelosuppression.
- *Long-term sequelae*: may occur many months or years after radiation therapy.
- Radiation therapy is known to be mutagenic, carcinogenic, and teratogen, and having increased risk of developing both secondary leukemia and solid tumor.



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Nuclear medicine

Radionuclides:

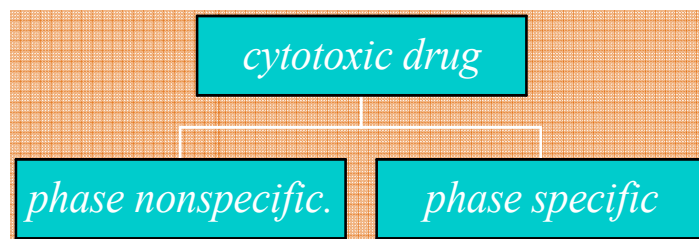
- For decades have been used systemically to treat malignant disorders.
- They are administered by specialists in nuclear medicine or radiation oncologist.
- Radioactive iodine: in the form of ^{131}I is effective therapy for well differentiated thyroid ca
- Strontium-89. Is used for the treatment of body metastasis. It is an alkaline earth element in the same family as calcium

Chemotherapy:

- Systemic chemotherapy is the main treatment available for disseminated malignant diseases.
- Progress in chemotherapy resulted in cure for several tumors.
- Chemotherapy usually require multiple cycles.

Classification of cytotoxic drug:

Cytotoxic agent can be roughly categorized based on their activity in relation to the cell cycle.



What is the difference between phase specific & phase non specific?

- *Phase non-specific:*

The drugs generally have a linear dose-response curve (↑ the drug administration, the ↑ the fraction of cell killed).

- *Phase specific:*

Above a certain dosage level, further increase in drug doesn't result in more cell killing. But you can play with duration of infusion.



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Chemotherapeutic agents:

- ✓ Alkylating agents
- ✓ Antimetabolites
- ✓ Antitumor antibiotic
- ✓ Plant alkaloids
- *Other agents :*
- ✓ Hormonal agent
- ✓ Immunotherapy

NOTE:

- Rituximab → for lymphoma → (expensive)
- Gleevec = Imatinib → gene therapy (expensive) works only on +ve Philadelphia chrom.
- Avastin (Bevacizumab) → against colon CA (prevent angiogenesis)
AE :perforation
- renal cell CA :Nexavar (works on genes) MRG
- no effective Rx for hepatocellular CA till Nexavar

Complication of Chemotherapy:

- Every chemotherapeutic will have some deleterious side effect on normal tissue .
- E.G; Myelosuppression, nausea&vomiting stomatitis, and alopecia are the most
- Frequently observed side effects.

Criteria used to describe response are:

Complete response (complete remission) is the disappearance of all detectable malignant disease.

Partial response: is decrease by more than 50% in the sum of the products of the perpendicular diameters of all measurable lesions.

Stable disease: no increase in size of any lesion or the appearance of any new lesions.

Progressive disease: means an increase by at least 25% in the sum of the products of the perpendicular diameters of measurable lesion or the appearance of new lesions.



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Endocrine therapy:

Many hormonal antitumor agents are functional agonist or antagonist of the steroid hormone family.

- ✓ Adrenocorticoids
- ✓ Antiandrogen
- ✓ Estrogen
- ✓ Antiestrogen
- ✓ Progestins
- ✓ Aromatase inhibitor
- ✓ Gonadotropin-releasing hormone agonists
- ✓ Somatostatin analogues

NOTE:

- breast & prostate CA are hormone sensitive
- Tamoxifen → anti-estrogen
- MRG is the problem in CA resistance
- RNA viruses are the problem
- Herceptin is a breast CA

Adrenocorticosteroid:

- Are frequently used in combination regimen for the treatment of lymphocytic leukemia and lymphoma.
- They function by binding to glucocorticoid-specific receptors present in lymphoid cells and initiate programmed cell death
- They most commonly used agent are, prednisone, methyl prednisone, dexamethosone.

NOTE:

- CD20 → related to B-lymphoma



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Antiandrogens:

➤ *Flutamide :*

- ✓ Effectively blocks the binding of androgen to its receptor in the peripheral tissue.
- ✓ It is used in the treatment of disseminated prostate ca

Biological therapy:

➤ *Immunotherapy:*

- ✓ Cytokines, Cellular therapy, Tumor vaccine:-

➤ *Hematopoietic growth factors.*