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## SECTION B

Q1- Explain when a patient will be needed radiation therapy?

Radiation therapy depend on patient. Some patient need radiation therapy before the surgery while some patient need radiation therapy during or after surgery. Some patient may also receive radiation therapy alone without any surgery. The timing of radiation therapy depends on the types of cancer being treated and the goal of treatment.

Pre-operative:-

are the type of radiation therapy in which we gives before the treatment. This type of radiation may be give to shrink a tumor so it can be easily removed.

by surgery and be less likely to return after surgery.

Intraoperative radiation therapy: (IORT)
Radiation given during surgery is called (IORT).
IORT can be external beam radiation therapy. IORT is some times used when normal structure are too closed to a tumor to allow the use of external beam radiation therapy.

Post-operative radiation therapy:
We also used radiation therapy after the surgery this type of radiation is called post operative radiation therapy.
Radiation therapy given after some types of surgery is called i.e (abdomen)
The combination of chemotherapy and radiotherapy may kill more cancer cells. but they are not safe because they can also cause more side effects.

Q2: Explain the following:

=> Image guided radiation therapy (IGRT)

In IGRT repeated imaging scans with the help of CT, MRI are perform during the treatment. After the IGRT, the help of these images we can easily identify the tumor size and location of the tumor. and to allow patient position. While the repeated image increase the accuracy of radiation treatment and may allow reductions in the planned volume of tissue to be treated. Therapy decreasing the total radiation dose to normal tissue

Treatment with IGRT.

* Breast cancer.
* Lung cancer.
* Head and neck cancer.
* Prostate cancer.

(2) Tomotherapy:-

Tomotherapy is a radiation therapy modality. Tomotherapy is a type of image guided IMRT. Tomotherapy is a new way to send the radiation to treat the cancer cells. In this procedure the radiation is delivered from all the angles as the ring turns and the couch moves through the gantry. Tomotherapy machines can capture CT images of the patient tumor immediately before treatment session to allow for very precise tumor targeting and sparing of normal tissue. Standard IMRT tomotherapy may be better than 3D CRT normal tissue from light radiation dose.

(3) Intensity Modulated Radiation therapy. IG IMRT.

IMRT uses of hundreds of tiny radiation beam shaping devices. Called collimators. to deliver a single dose of radiation The collimator can be stationary The intensity of collimator beam to change during treatment sessions. This type of dose allow different area of a tumor to receive different dose of radiation.

IMRT is used to kill the cancer cells and contral their growth.

IMRT is planned in reverse called inverse treatment planning. In this planning oncologist choose the radiation dose to different area of the tumor. in this procedure we used high power computer. the function of

this computer to calculate the required number of beams and angles of the radiation treatment.

Computer with 3D. CRT. IMRT can reduce the risk of some side effects such as damaged the salivery gland which can cause dry mouth.

Common side effect of IMRT.

* Skin irritation
* hair loss
* inflammation and swelling near tumor location.

(4) Stereotactic Radiosurgery:

Stereotactic radiosurgery is a technique of delivering radiation very specifically to a tanget inside the head. SRS uses extremely accurate image-guided tumor tongeting and patient position.

SRS can not damaged the normal tissue.
SRS can be used to treat small benign tumors. They are mostly used in the brain and spinal tumors.
During this procedure doctor used head frame to immobilized the patient head.
Stereotactic body radiation therapy. delivered radiation in the few sessions. using small radiation field & high dose than 3D-CRT.
SBRT is usually used to treat only small - isolated tumors including lung and liver cancer.
SBRT also called cyberknife.
Gamma knif. treat
① Small brain tumors.
② Blood vessel malformation.
③ Nerve condition.

# Proton Therapy:

Protons are a type of charge particle. External beam radiation therapy can be delivered by proton beam Proton beam differe from the photon beam.
Protom beam deposit energy in living tissue.
Proton should be use to reduce the exposure of normal tissue to radiation. They deliver a high dose of radiation to a tumor, They are not compared with standard external beam radiation therapy.
Other changed particle such as electron beam are used to superficial tumors. i.e skin cancer or tumor near the surface of the body. So theiyore they can't treat deep tumor within the body. while proton therapy used in the treat deep tumor in the body.

Q3: Side effect of radiation therapy?

Ans: Radiation therapy can cause two type of side effect one is (acute) other is late (chronic) side effect.
Acute mean early effect they occours during the treatment while chronic side effect occours after the months or year after the treatment.
Side effect also depened on the area of the body being treated.
Acute side effects:

Acute side effects are caused by damage to rapidly dividing normal cells in the area being treated.
These effect include:

1. Skin irritation.
2. hair loss (when head neck area is treated)

(3) Urinary problem (when the lower abdomen area is treated)

(4) Fatigue

(5) Nausea (without vomiting)

Amifostine:

They are the only drugs to protect the normal tissue from radiation during treatment.

Late side effects of radiation:

Late side effect depending on the area of the body treated. include:

(1) Fibrosis.

(2) Memory Loss.

(3) Damaged bowel causing diarrhea, bleeding

(4) infertility.

Cancer is the second causes of radiation exposure.

Second cancer that develop after radiation therapy

depend on the treated part of the body. i.e girls treated with radiation to the chest for Hodgkin lymphoma have an increased risk of developing breast cancer later in life.

The END