

CANCER

DIFFERENCES BETWEEN NORMAL CELLS AND CANCER CELLS

Normal cells:

- Carefully controlled growth, the number of cells formed equals that lost by death or injury.

Cancer cells:

- Uncontrolled growth, continue to divide without regard for the needs of the body, forming tissues that are without structure and organisation. Even if a tumour grows slowly, therefore, more cells are created than are lost, so the tumour forms a mass.

Metastasis:

- Cancer cells resemble the tissue they started in e.g. breast cancer resembles breast tissue bone cancer resembles bone cells. Metastases is the ability of the cancer cell to spread via blood or lymphatic systems the result is cancerous breast tissue growing in the brain or lung or liver
- Many tumours can now be treated successfully with surgery, radiotherapy or chemotherapy alone or in combination. The most common cause of cancer treatment failure is metastasis.

Cancer management

- Prevention
- Cure
- Palliative

Cancer management

Aim to cure	Aim to reduce symptoms
Surgery	Surgery
Chemotherapy	Chemotherapy
Radiotherapy	Radiotherapy
Early detection/screening	Palliative care

RADIOTHERAPY

- The Way it works: Energy is applied to cells, which results in cell death. This can be immediate or delayed.
- Planning before the therapy is done so that the radiation targets the malignant cells, but it will also affect some healthy cells.
- The unit of radiation dose is called a Gray (Gy)

Side effects of radiation

Local:

- Resembles sun burn both externally and internally
- The beam goes through normal tissue to get to the targeted tumour

- Shields are used to minimise damage to normal tissue

Systemic:

- Patients complain of increasing and overwhelming fatigue

Information to patient before radiotherapy

- Description of the procedure
- Possible change in appearance - sunburn
- Anticipated discomfort and measures available for relief
- Potential short and long term complications
- Restrictions on activity
- Visiting restrictions while on radiotherapy
- Radiation precautions observed by personnel

There are several ways to give radiotherapy

- External beam
- Brachytherapy where radiation sources are placed within or close to the target e.g. in a cavity, in the tissue or on a skin or eye tumour
- Intraoperatively, during surgery
- Whole body irradiation, which is aimed at eliminating any residual tumour .
- Chemoradiotherapy e.g.. Radioactive iodine

Chemotherapy

- Patient education (mouth care, skin care, hair loss, nutrition, fertility)
- Routes: topical, oral, intramuscular, intravenous, intraarterial, intraperitoneal, intrapleural, intravesical, intrathecal, intraventricular. Vascular access devices (central venous catheters, implantable ports etc.)

Factors which influence chemotherapy

- the tumour: size, growth rate, cell types
- the host: nutritional status, immune function,
- drugs (13 groups of drugs): sensitivity of tumour type, toxicity, route
- Genetics: resistance
- Side-effects experienced

Toxicities

- Systemic
- Organ toxicities

Toxicities

Systemic:

- Bone marrow suppression- potentially lethal - damage to alimentary and respiratory tract mucosa allows entry to infection
- Fatigue
- Gastrointestinal
 - Anorexia
 - Diarrhoea
 - Constipation
 - Nausea and vomiting

Organ toxicities:

- Heart
 - acute
 - Chronic
- Nervous system
 - central nervous system is protected by the blood: brain barrier. - peripheral nerve damage can cause paralysis, loss or change of sensation.
 - autonomic nerve damage can cause ileus, constipation, impotence, urinary retention, postural hypotension
 - peripheral neuropathy: starts with decreased vibratory sense, stocking and glove distribution pins and needles, then loss of reflexes, muscle weakness, loss of position sense.
- Pulmonary toxicity can be irreversible and progressive.
- Hepatotoxicity is uncommon and can be reversible

Organ toxicities

- Kidneys and bladder:
 - Haemorrhagic cystitis can range from microscopic haematuria to frank bleeding.
 - Nephrotoxicity can occur as many chemotherapy drugs are excreted through the kidneys.
- Gonadal toxicity. This depends on age, gender and the specific drugs. It can result in infertility and premature menopause

Quality of life

In some cancers, chemotherapy may not prolong life by more than a few months, but it can improve quality of life.

For example, in Non small cell lung cancer (NSCLC):

- Cough, haemoptysis and pain are relieved in 70%
- Anorexia in 40%
- Dyspnoea in 30%

Late effects of chemotherapy:

Because some tumours can now be effectively treated, there are long term survivors. We therefore need to be aware of long term toxicities. These may detract from quality of life.

Late effects of chemotherapy

- Endocrine and metabolic
- Fertility
- Organ specific problems
- Secondary malignancies
- Neuropsychological consequences

Summary

- Cancer can be prevented, detected early, treated and palliated.
- Each patient needs to be given the information necessary to make an informed decision.
- We need to be aware of the side effects of treatments and know when to refer.

“Health ...designates the ability to adapt to changing environments, to growing up and to ageing, to healing when damaged, to suffering and to the peaceful expectation of death.

Health embraces the future as well, and therefore includes anguish and the inner resources to live with it. “

Ivan Illich Medical Nemesis in Journal of Epidemiology and Community Health 2003;57:919-922