CANCER - WESTERN UNDERSTANDING

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For articles on the TCM approach, see Teachings, Traditional Chinese Medicine

Second most common cause of death (after heart disease and stroke)

67% of deaths are in people overt age 65.

Most common (in USA):

- Prostate – 24%
- Breast – 13%
- Lung – 13%
- Colon-rectum – 9%
- Uterus – 2.5%

Definition: transformation (carcinogenesis) of normal cells, causing them to enlarge and divide more rapidly.

Metastasis to other sites, via blood or lymph circulation, local extension, or surgical intrusion.

Types:

- Adenocarcinomas – from epithelial and glandular tissue
- Carcinomas – originate in epithelial cells
- Erythroleukemia – from erythrocytes (RBC)
- Gliomas – from glial cells (nerve cells in brain, spinal cord, pineal or pituitary glands, retina)
- Leukemia – from lymphocytes
- Lymphoma – from lymphatic tissue
- Melanomas – from pigmented cells
- Myelomas – from plasma cells (B lymphocytes, bone marrow)
- Sarcomas – from connective, muscle or bone tissue (soft tissue)

Causes:

1) Starts in genes.

Molecular changes in DNA in cells after invasion by carcinogenic factors.

Causes mutations and gradual changes in cellular genes

There are 100 cancer genes that have been identified

Two types of normal genes which mutate:

Oncogenes – activate cell division

Tumor suppressor genes – halt cell division

Two types of defects. Usually cancer results from combination of both types of defects:

Genetic mutation – inherited defect

Neurofibroma

Rectal and colon polyps

Nephroblastoma (Wilms tumor)

Tendencies towards cancers of:

Liver

Stomach

Colon

Breast

Cervix

Acquired mutation – exposure to a carcinogen

Radiation most dangerous

UV radiation

Fibrous materials – asbestos, fiberglass

Asbestos > lung

Vinyl Chloride > liver

Hydrocarbons, benzopyrene in air > lung

Tobacco > lung, pharynx, pancreas, kidney, bladder, colon

Nitrates, charcoal > SI and LI

Estrogen > breast, vagina

2) Other causes

a) Microbes

1) Viruses may trigger carcinogenesis.

(China) At least 30 different kinds of tumors have shown signs of virus.

May be coexisting, may be root cause (unknown).

Leukemia, breast cancer, nasopharyngeal cancer, lymphoma, liver, cervix

2) Fungus may trigger carcinogenesis. Contain mycotoxins that may be carcinogenic.

3) Parasites may cause cancer.

Schistosomiasis can cause liver cancer.

b) Endocrine factors can aggravate cancers of:

Ovary, breast, pituitary, thyroid, testicle, prostate

c) Nutritional factors

1) B12 deficiency > leukemia, stomach cancer

2) Vitamin and mineral supplementation inhibits cancer growth:

Vitamin C, iodine, copper, zinc, magnesium, molybdenum, selenium

3) Low fat, high fiber inhibits cancer. High fat, low fiber >

Cancers of colon, breast.

d) Psychological factors

Optimistic people respond better to treatment

Depression, anxiety, phobia diminishes success

One study estimates that 75% of people with cancer had a history of anxiety or depression.

Carcinogens

At least 1000 identified carcinogens. These may account for 80% of all cancers.

Polycyclic aromatic hydrocarbons with 3,4 benzopyrene rings

Coal tar, nicotine, creosote

Alkylating agents (drugs, chemicals)

Aromatic amino compounds and dyes

Nitrosamine

Color additives (FDC yellow)

Heavy metals: zinc, cadmium, arsenic, nickel, and mercury

Phytotoxins

They cause carcinogenic metabolites, or alter enzymes that activate aromatic hydrocarbons

Immune response

Immunosurveillance

Body develops cancer cells all of the time, but immune system considers them foreign, and neutralizes them as they form.

Cell-mediated response:

T lymphocytes destroy antigens and creates killer cells against cancer cells

Humoral immune response –circulating antibodies.

In cancer, the tumor cell is able to release a factor that blocks the antibody.

Cancer arises when immune function decreases. These include:

1) Aging cells – when copying genetic material they begin to err, causing mutations. An aging immune system does not recognize the mutations as foreign, allowing proliferation into a malignant tumor.
2) Cytotoxic drugs, radiation or steroid drugs – decreases antibody production, destroys circulating lymphocytes.
3) Extreme stress – depresses immune system
4) Chronic viral infection – depresses immune system
5) AIDS – weakens cell-mediated immunity.
6) Cancer itself – immunosuppressive, lowered immune reactivity (anergy)

Diagnosis

X ray, endoscopy, isotopes scan, CT scan, MRI.

Biopsy is best: by curettage, fluid aspiration (lung), needle aspiration (breast), dermal punch (skin or mouth), endoscopy (rectal polyp), surgical excision (organs, lymph lodes).

Carcinoembryonic antigen (CEA) used for colon, stomach, pancreas, lung, breast, sarcomas, leukemias, lymphomas.

These are useful for following up chemotherapy.

Other: Alpha-fetoprotein, beta human chorionic gonadotropin (testicular cancer), and prostate specific antigen.

Staging

TNM System is international:

Tumor size

Nodal involvement

Metastatic progress

Reliable comparison of treatments and survival rates among large population groups.

Grading

a) Classifies a lesion according to corresponding normal cells

b) Compares tumor tissue too normal tissue

c) Estimates tumor's growth rate

For example: a low-grade tumor has cells more closely resembling normal cells, whereas a high-grade tumor has poorly differentiated cells.

Therapies.

Used alone, or in combination depending on type, stage, localization, etc.

- Surgery
  - Depends on cancer, but generally, 85% cure if at early stage
- Radiation
  - Most effective for:
    - Lymphosarcoma, Hodgkin's, ovary, multiple myeloma, nasopharynx
- Chemotherapy
  - 200 chemo-agents, of which 80 can be used clinically.
  - Necessary in metastasis
  - All harm normal cells
  - Only fairly effective
  - Best response (30 – 90 % cure rate):
    - Testicle, acute lymphocytic leukemia, lymphoma, Hodgkin's
  - Can prolong life in 40 – 70% of:
    - Prostate, chronic lymphocytic leukemia, neuroblastoma, breast, multiple myeloma
- Immunotherapy
- Hormonal therapy