NURS 821 Advanced Pathophysiology
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Lecture 3 Mechanisms and Manifestations of Disease (cont'd)

Part 3 Neoplasia (cont'd)

Unique Cancer Cell Properties

- May burden immune system with tumor load
- Metastasize-may secrete enzymes to infiltrate
- Establish own blood supply
- May secrete hormones

Unique Cancer Cell Properties

- Essentially escape all cell controls
  - Lack adhesion, cohesion
  - Lack cell-cell communication to stop growth-grow quickly
- May secrete factors to decrease T_H and T_K function
- Anaerobic cells
- Hide in blood clots
- Estimated to occur undetected 6 times in 70 years

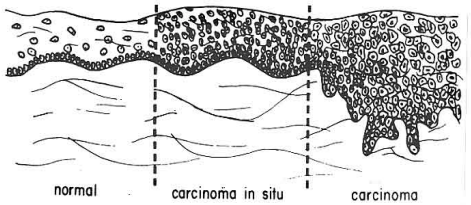
Unique Cancer Cell Properties

- Mimic fetus-invisible to immune system; secrete HCG
- Mutate, change DNA
- Nitrogen traps
  - Weaken host
  - Increase metabolic and caloric needs while decreasing appetite
- Hide in immune-privileged places
- Grow, infiltrate with finger-like growth

Cancer Pathophysiology

- Neoplasia growth and spread
  - Growth not faster, just don't die on schedule
  - Depends on number cells dividing or moving through cell cycle
  - Cell cycle timing
  - Number of cells lost
  - Growth factors which facilitate cells to enter Go phase when no replacement cells needed

Carcinoma vs. Carcinoma in situ



- Basement membrane invasion differentiates carcinoma from carcinoma in situ.

Cancer Pathophysiology

- Lack of cellular controls allow growth, detachment, and distant spread
- Spread through blood, lymphatics, direct extension or invasion of surrounding organs and tissues
- Seeding-tumor erodes into body cavities, depositing cells on serosal surfaces; may be iatrogenic

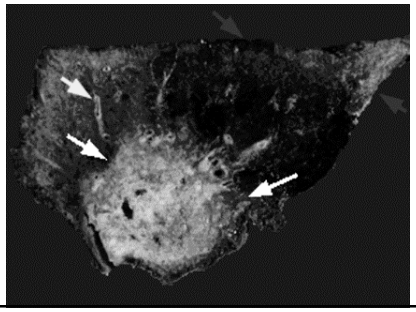
Cancer Pathophysiology

- Metastases-tumor cells break loose (detach), traveling to distant parts where implantation occurs
- Invasion
- Establish own blood supply and proliferate

Cancer Metastasis

- Occurs due to:
  - Infiltration
  - Direct extension
  - Invasion of surrounding tissue
  - Seeding-may be iatrogenic
  - Emboli travel until lodge in capillaries
  - Common sites-liver and lungs

Lung Adenocarcioma with Projections



Cancer Manifestations

- Depend on site, size, ability to expand
- Palpable mass
- Pain
- Paraneoplastic syndromes
- Cancer cachexia
- Pneumonias, effusions
- Abnormal bleeding
- Jaundice
- Obstruction
- Pathologic fracture
- Infection
- Hormone production

Seven Warning Signs of Cancer

- ***C***hange in bowel or bladder habits
- ***A*** sore that does not heal
- ***U***nusual bleeding or discharge
- ***T***hickening or lump
- ***I***ndigestion or difficulty swallowing
- ***O***bvious change in wart or mole
- ***N***agging cough or hoarseness

Significance of Cancer Cachexia

- Definition-nutritional deterioration of unknown etiology influencing therapy responses and survival
- Cachectin (TNF) secreted by macrophages and NK cells-blocks triglyceride uptake by cells; produces a shock-like endotoxin; directly toxic to tumor cells

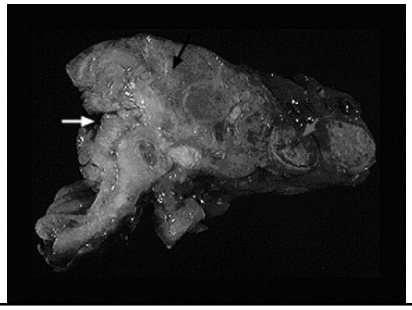
Cancer Cachexia

- Often presenting sign of malignancy-advanced
- Weight loss-poor indicator of survival in all tumor types
- Incidence varies, most significant in GI cancers

Cancer Complications

- Depend on cancer characteristics
- Infections
- Malnutrition
- Dehydration
- Hemorrhage-ulceration, necrosis
- Obstruction of viscera
- Serous cavity effusions
- Pain

Adenocarcinoma of Colon with Lymph Metastases



Gastric Cancer with Necrosis

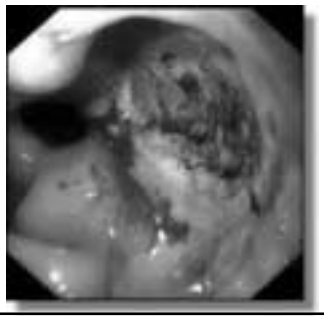


TABLE 24–3 TNM Clinical Classification

Primary Tumor (T)

TX	Primary tumor cannot be assessed.
T0	No evidence of primary tumor.
Tis	Carcinoma in situ.
T1, T2, T3, T4	Increasing size and/or local extent of the primary tumor.

Regional Lymph Nodes (N)

NX	Regional lymph nodes cannot be assessed.
N0	No regional lymph node metastasis.
N1, N2, N3	Increasing involvement of regional lymph nodes.

Distant Metastasis (M)

MX	Presence of distant metastasis cannot be assessed.
M0	No distant metastasis.
M1	Distant metastasis

Modified from American Joint Committee on Cancer. (1988). Beahrs, O. H., Henson, D. E., Hutter, R. V., & Myers, M. H. (Eds.). *Manual for staging of cancer* (3rd ed., p. 7). Philadelphia: J. B. Lippincott.

Table 24–3
TNM Clinical Classifications

Grading of Cancer

- GX-grade can not be determined
- G1-tumor cells well-differentiated, closely resembling parent or tissue of origin
- G2-tumor cells moderately differentiated, retain some parent tissue characteristics
- G3-tumor cells poorly differentiated, parent tissue identity usually able to be established
- G4-tumor cells poorly differentiated, tissue origin difficult or impossible to determine