Continuity Clinic: ½ day per week for 3 years

This is a 6 month continuity rotation in each of 6 major disease groups which fellows complete over the three years of fellowship. Each fellow is assigned one attending for the 6 months.

Medical Knowledge

Breast Cancer

G. Breast Cancer

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   (1) Premalignant
   (2) Malignant
   (a) Histologic types

   b. Genetics
   (1) *BRCA-1*
   (2) *BRCA-2*
   (3) Other genetic syndromes
   (4) Counseling and testing

   c. Assessment of risk
   (1) Family history
   (2) Lifestyle factors
   (3) Hormone replacement therapy
   (4) Gail, Claus, and other models

3. Prevention
   a. Lifestyle changes
   b. Chemoprevention
   (1) Tamoxifen and other SERMs
   (2) Other agents

   c. Prophylactic bilateral mastectomies
   d. Prophylactic bilateral oophorectomy

4. Screening
   a. Mammography
   b. Other imaging techniques
   (1) Ultrasound
   (2) MRI

c. Breast examination
(1) Self-examination
(2) Examination by a health-care provider

d. Ductal lavage
e. Genetic screening

5. Diagnosis
   a. Management of a palpable mass
   b. Management of nonpalpable, image-detected abnormalities
   c. Biopsy techniques
   (1) Fine-needle aspiration
   (2) Core, excision, and needle localization biopsy

   d. Axillary dissection
   (1) Complete
   (2) Sentinel node

6. Staging and prognostic factors
   a. TNM system
   b. Histologic type
   c. Estrogen and progesterone receptors
   d. Other biologic and molecular markers
   e. Staging recommendations

7. Treatment by stage
   a. Premalignant
   (1) Atypical hyperlasia

   b. Carcinoma-in-situ
   (1) Lobular
   (2) Ductal

   c. Early-stage invasive carcinoma
   (1) Primary lesion
   (a) Surgery
   (b) Radiation
   (c) Chemotherapy
   i. Preoperative
   ii. Postoperative

   (d) Endocrine
   iii. Preoperative
   iv. Postoperative

   (e) Trastuzumab and other biologic therapy

(f) Estimating the benefits of systemic adjuvant therapy

d. Locally advanced and inflammatory breast cancer
(1) Multimodal therapy

e. Locally recurrent
(1) In breast recurrence
(2) Chest wall recurrence
(3) Surgery
(4) Radiation therapy
(5) Systemic therapy

f. Metastatic breast cancer
(1) Surgery
(2) Radiation therapy
(3) Systemic therapy
(a) Endocrine therapy
(b) Chemotherapy
(c) Single-agent Versus combination therapy
(d) Monoclonal antibody therapy

8. Follow-up
   a. ASCO and other guidelines

9. Supportive care
   a. Psychosocial issues and support groups
   b. Lymphedema
   c. Bisphosphonates for bone metastases
   d. Menopausal symptoms
   e. Health maintenance for premature menopause
   (1) Bone health

   f. Sexuality and fertility
   g. Cognitive dysfunction
   h. h. Surgical reconstruction

10. Other/Special issues
    a. Special problems in breast cancer management
    (1) Male breast cancer
    (2) Breast cancer in pregnancy
    (3) Breast cancer in elderly women
    (4) Breast cancer in very young women
    (a) Oophorectomy

    (5) Breast cancer presenting as axillary metastases

(6) Phyllodes tumors
(7) Paget's disease of the nipple

GI Malignancies-

R. Hepatocellular Cancer

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   (1) Histologic variants
   (2) Grade

   b. Genetics and molecular markers
   (1) Hemachromatoses
   (2) Wilson's disease
   (3) Alpha1-antitrypsin deficiency

   c. Viral factors
   (1) Hepatitis B
   (2) Hepatitis C

   d. Chemical exposure
   (1) Alcohol
   (2) Aflatoxin

   e. Cirrhosis

3. Prevention
   a. Hepatitis B vaccination
   b. Alcohol cessation
   c. Tobacco cessation

4. Screening
   a. Alpha-fetoprotein

5. Diagnosis
   a. Clinical signs and symptoms
   b. Imaging
   c. Biopsy
   d. Tumor markers

6. Staging and prognostic factors
   a. TNM staging

b. Histologic features
c. Grade
d. Fibrosis score
e. Alpha-fetoprotein

7. Treatment
a. Resectable disease
(1) Surgery
(2) Liver transplantation

b. Unresectable liver-only disease
(1) Ablative procedures
(2) Hepatic arterial embolization
(3) Chemotherapy

c. Metastatic disease
(1) Chemotherapy

Anal Cancer Colorectal Cancer

1. Epidemiology
a. Incidence rates
b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
a. Pathology
b. Genetics and genetic syndromes
(1) Familial adenomatous polyps
(2) Hereditary nonpolyposis colorectal cancer
(3) Other

c. Pathogenesis
d. Assessment of risk
(1) Family history
(2) Dietary factors
(3) Lifestyle factors
(4) Medical history
(a) Inflammatory bowel disease
(b) Diabetes mellitus

Prevention
e. Lifestyle changes
f. Chemoprevention
(1) Anti-inflammatories

g. Colectomy

3. 4. Screening
    a. Rectal examination
    b. Fecal occult blood test
    c. Colonoscopy surveillance (general population)
    d. Virtual colonoscopy
    e. High-risk populations
(1) Inflammatory bowel disease
(2) Genetic abnormalities
(3) Use of risk criteria and models

4. Diagnosis
    a. Clinical signs and symptoms
    b. Imaging
    c. Endoscopic biopsy

5. Staging and prognostic factors
    a. TNM system
    b. Histology and grade
    c. Genetic and molecular abnormalities

6. Treatment
    a. Treatment by stage
(1) Cancer in a polyp
(2) Stage II colorectal cancer
(a) Surgery
(b) Chemotherapy
(c) Radiation therapy

(3) Stage III colorectal cancer
(a) Surgery
(b) Chemotherapy
(c) Radiation therapy

(4) Metastatic and recurrent colorectal cancer
(a) Surgery
i. Resectable regional metastases
    1. Liver only
    2. Lung only
    3. Liver plus lung

ii. Anastomotic recurrence

(b) Chemotherapy
iii. Regional perfusion of chemotherapy
iv. Chemoembolization
v. Chemotherapy

(c) Radiation therapy

(5) Special surgical issues
(a) Laparoscopy
(b) Sentinel node biopsy
(c) Total mesorectal excision in rectal surgery

7.
8. Follow-up after curative resection
   a. ASCO and other guidelines

9. Supportive care
   a. Treatment-related toxicities
   (1) Ostomy care
   (2) Radiation proctitis
   (3) Diarrhea

10.

L. Esophageal Cancer

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   (1) Squamous cell
   (2) Adenocarcinoma

   b. Assessment of risk
   (1) Barrett's esophagus
   (2) Gastroesophageal reflux disease
   (3) Smoking and alcohol use

   c. Genetic and molecular abnormalities

3. Prevention
   a. Lifestyle changes

4. Diagnosis
   a. Clinical signs and symptoms
   b. Endoscopy and biopsy
   c. Imaging

5. Staging and prognostic factors
   a. TNM staging

6. Treatment
    a. Local-regional disease
    (1) Surgery
    (2) Radiation therapy
    (3) Chemotherapy

    b. Recurrent and metastatic disease
    (1) Chemotherapy
    (2) Radiation therapy
    (3) Surgery

7. Supportive care
    a. Management of obstruction
    (1) Endoscopic stenting
    (2) Other

    b. Supportive management

M. Gallbladder Cancer

1. Epidemiology
    a. Incidence rates
    b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
    a. Pathology
    b. Risk factors
    (1) Inflammatory bowel disease
    (2) Gallstones (cholesterol-type)
    (3) Chronic inflammation

3. Diagnosis
    a. Clinical signs and symptoms
    b. Imaging
    c. Surgery
    d. Cholangiography
    e. Bile cytology

4. Staging and prognosis
    a. TNM

5. Treatment by stage
    a. T1/T2 tumors
    (1) Surgery

    b. T3/T4 tumors
    (1) Surgery

(2) Radiation therapy
(3) Chemotherapy

c. Evaluation after laparoscopic cholecystectomy
(1) Surgery

d. Recurrent or metastatic disease
(1) Chemotherapy
(2) Radiation therapy

6. Supportive care
   a. Biliary drainage

N. Gastric Cancer

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   b. Genetic and molecular factors
(1) Precursor lesions
(2) Adenomatous and gastric polyps

c. Nutritional factors
(1) Vitamin B12/pernicious anemia
(2) Other

d. Lifestyle
(1) Tobacco use
(2) Occupational exposure
(3) Helicobacter pylori and other infections

3. Screening
   a. Endoscopy
   b. Imaging

4. Diagnosis
   a. Clinical signs and symptoms
   b. Imaging
   c. Endoscopy and biopsy

5. Staging
   a. TNM staging

6. Treatment
   a. Resectable

(1) Surgery
(2) Chemotherapy
(3) Radiation therapy
(4) Laparoscopy
(5) Combined modality

b. Unresectable and metastatic
(1) Chemotherapy
(2) Radiation therapy

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Pathology
(1) Premalignant lesion
(2) Histology
(a) Cloacogenic
(b) Squamous cell

b. Risk factors
(1) HPV infection
(2) Sexual activity
(3) Condylomata
(4) HIV infection

c. Assessment of risk
(1) Lifestyle factors
(2) HIV infection

3. Prevention
   a. Lifestyle changes

4. Screening
   a. Anal Papanicolaou tests

5. Diagnosis
   a. Physical examination
   b. Biopsy
   c. Anoscopy/proctoscopy
   d. Transrectal ultrasound
   e. Aspiration of palpable inguinal nodes

6. Staging and Prognostic factors

a. TNM system
b. Symptoms

7. Treatment by stage
   a. Stage 1
   (1) Surgery

   b. Local disease
   (1) Combined modality

   c. Positive inguinal nodes
   (1) Combined modality

   d. Recurrent or residual disease
   (1) Surgery
   (2) Radiation therapy
   (3) Chemotherapy

   e. Metastatic disease
   (1) Chemotherapy

8. Follow-up
9. Special issues
   a. Anorectal melanoma

D. Biliary Tree Cancer

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   b. Risk factors
   (1) Primary sclerosing cholangitis
   (2) Gallstones
   (3) Choledochal cysts

3. Diagnosis
   a. Clinical signs and symptoms
   b. Imaging
   c. ERCP
   d. Endoscopic biopsy

4. Staging and prognostic factors
   a. TNM
   b. Histologic grade

5. Treatment by stage
    a. Resectable disease
    (1) Surgery
    (2) Radiation therapy

    b. Unresectable disease
    (1) Liver transplantation

    c. Advanced or recurrent disease
    (1) Chemotherapy
    (a) Intravenous
    (b) Hepatic infusion

    (2) Radiation therapy

6. Supportive care
    a. Biliary drainage

X. Neuroendocrine (carcinoid) Tumors

1. Epidemiology
    a. Incidence rates
    b. Mortality rates
    c. Hereditary syndromes
    (1) MEN

    d. Second neuroendocrine tumor

2. Pathogenesis, pathology, and tumor biology
    a. Pathology
    (1) Defined by amine precursor uptake and decarboxylation (APUD) cell of origin
    (2) Classification by site of primary
    (a) GI tract
        i. Foregut
        ii. Midgut
        iii. Hindgut

    (b) Lung
    (c) Pancreas
    (d) Thymus

    (3) Histochemistry and products
    (a) Serotonin
    (b) Calcitonin
    (c) Gastrin
    (d) VIP
    (e) Glucagon
    (f) Insulin

(g) Other

b. Genetic factors

(1) MEN

3. Prevention
   a. Genetic counseling

4. Diagnosis
   a. Clinical signs and symptoms

(1) Symptoms related to hormone produced
(2) Carcinoid syndrome
(3) Carcinoid crisis

b. Biopsy

(1) Positive staining for chromogranin and neuron-specific enolase

c. Measurement of secretary product

(1) 24-hour 5-hydroxy-indole acetic acid

d. Imaging
e. Endoscopy as appropriate by site
f. Radiolabeled octreotide for somatostatin receptor scintigraphy

5. Screening and prognostic factors
   a. No standard staging
   b. Prognostic factors

(1) 5HIAA levels
(2) Primary site
(3) Liver metastases
(4) Histologic features

6. Treatment
   a. Observation
   b. Surgery
   c. Somatostatin analog
   d. Chemotherapy
   e. Palliation of symptoms

(1) Diarrhea
(2) Bronchospasm
(3) Cardiac disease

f. Interferon
g. Liver directed therapy

7. Follow-up

a. No standard follow-up

AA. Pancreatic Cancer

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   b. Progression from ductal epithelial dysplasia
   c. Genetic and molecular factors
   (1) p16 mutations
   (2) Other

   d. Pancreatic cystic neoplasms

3. Risk factors
   a. Tobacco use
   b. Pancreatitis
   c. Genetic factors
   (1) BRCA2
   (2) Familial pancreatic cancer
   (3) MEN
   (4) Others

4. Prevention
   a. Smoking cessation
   b. Genetic counseling

5. Diagnosis
   a. Clinical signs and symptoms
   b. Endoscopy and biopsy
   (1) ERCP

   c. Laparoscopy
   d. Imaging
   e. Imaging-directed biopsy
   f. Surgery

6. Staging and prognostic factors
   a. TNM

7. Treatment
   a. Resectable disease-surgery
   (1) Observation
   (2) Chemotherapy
   (a) Preoperative

(b) Postoperative

(3) Radiation therapy
(a) Postoperative

(4) Combined radiation therapy/chemotherapy

b. Unresectable disease
(1) Radiation therapy and chemotherapy
(2) Chemotherapy

c. Metastatic and recurrent disease

8. Follow-up after curative resection
9. Supportive care
   a. Pain
   (1) Celiac block

   b. Obstruction
   (1) Biliary stenting
   (2) Endoscoping stenting of gastric outlet obstruction

   c. Malabsorption

Hematologic Malignancies

Chronic Myeloproliferative Diseases

Chronic Myelogenous Leukemia

bcr/abl translocation (Philadelphia chromosome) in the "phases" of CML disease progression and the associated prognoses associated with these.

pharmacologic agents (including tyrosine kinase inhibitors), immunologic agents and biologic agents (e.g. interferon-α) used in the treatment

Polycythemia Rubra Vera

role of phlebotomy, pharmacologic agents and radioactive phosphorous in the treatment of polycythemia rubra vera.

Chronic Idiopathic Myelofibrosis (Agnogenic Myeloid Metaplasia/Myelofibrosis)

epidemiology, risk factors, clinical presentation and natural history of patients with chronic idiopathic myelofibrosis, therapy and prognosis.

Essential Thrombocythemia

risks of bleeding and thrombosis.

role of platelet pheresis, hydroxyurea, and anagrelide

Acute Myeloid Leukemias

Leukemogenesis
Diagnosis
Classification of AML as per the WHO (and the historically used FAB) classification, morphologic analysis, immunohistochemical stains, cytogenetics, flow cytometry, fluorescence in situ hybridization (FISH), RT-PCR and real-time PCR. Secondary vs primary AML
Prognosis
Treatment- anthracyclines and cytarabine chemotherapy agents, of induction therapy, consolidation therapy and maintenance.
Management of relapsed and refractory disease
Use of growth factors
Treatment of elderly patients

Acute promyelocytic leukemia (APL)
use of all-trans retinoic acid, arsenic trioxide, anthracyclines and cytarabine
monitoring of minimal residual
classical and non-classical APL and
retinoic acid syndrome
management of coagulopathy

Myelodysplastic Syndrome (MDS) Disorders
pathophysiologic mechanisms
diagnosis, natural history and therapy of MDS disorders
International Prognosis and Staging System (IPSS) classification
genetic abnormalities associated with MDS
utility of cytogenetics in the diagnosis, management and assessment
Treatment

B-cell Neoplasms
Lymphoblastic Leukemia/Lymphoma
Classification
Diagnosis- bcr/abl and CNS disease
Treatment and need for prolonged therapy consisting of multiple phases of treatment.

Lymphoplasmacytic Lymphoma (Waldenström's Macroglobulinemia)
Management, including hyperviscosity syndromesChronic

Lymphocytic Leukemia/Small Lymphocytic Lymphoma
staging systems (e.g. Rai and Binet) and role and use of cell surface marker analysis (e.g. flow cytometry, immunohistochemical stains) in the diagnosis and differential diagnosis of CLL/SLL and entities that are often confused with CLL/SLL (e.g. hairy cell leukemia, marginal zone lymphoma, splenic lymphoma with villous lymphocytes, large granular lymphocyte proliferative disorder, adult T-cell leukemia/lymphoma, prolymphocytic
manage the paraneoplastic events that often accompany CLL/SLL.
Treatment of CLL/SLL

Hairy Cell Leukemia

the use of morphologic analysis, flow cytometry, immunohistochemistry staining and, specifically, tartrate resistant alkaline phosphatase (TRAP) staining for making the diagnosis of hairy cell leukemia.

Plasma Cell Disorders

Plasma Cell Myeloma (Multiple Myeloma), Plasmacytomas and Other Plasma Cell Disorders

diagnosis and therapy of less common plasma cell disorders including, but not limited to, nonsecretory multiple myeloma, plasma cell leukemia and POEMS syndrome.

Amyloidosis

Diagnosis and characterization of the variety of amyloid proteins

Castleman's Disease

B-cell Lymphomas

Diagnosis and Staging

precursor B-lymphoblastic leukemia/lymphoma, splenic marginal zone lymphoma including mucosa-associated lymphoid tissue (MALT) lymphoma, nodal marginal zone B-cell lymphoma, follicular lymphoma, mantle cell lymphoma, diffuse large B-cell lymphoma, mediastinal (thymic) large B-cell lymphoma, intravascular large B-cell lymphoma, primary effusion lymphoma, Burkitt's lymphoma/leukemia, angiocentric lymphoma, and anaplastic large cell lymphoma.

imaging studies (e.g. CT, MRI, PET, gallium scans, and others), molecular diagnostics, and cytogenetics

Treatment

Including immunotherapy and radioimmunotherapy

B-cell Proliferations of Uncertain Malignant Potential

Post-transplantation Lymphoproliferative Disorders

understanding of the histologic and clonal versus non-clonal variants of PTLD

implications of PTLD and its treatment on the transplanted organ.

T-cell and NK-cell Neoplasms

Adult T-cell Leukemia/Lymphoma

Diagnosis and role of HTLV-I in the pathogenesis of this disorder.

Mycosis Fungoides, Sezary Syndrome and Cutaneous T-cell Lymphoma

T-cell Large Granular Lymphocytic Leukemia

associated affects on hematopoiesis, presumed to be due to cytokines.

T-cell Lymphomas

peripheral T-cell lymphoma, angio-immunoblastic T-cell lymphoma, precursor T-lymphoblastic leukemia/lymphoma, nasal T/NK-cell lymphoma, intestinal T-cell lymphoma and anaplastic large cell lymphoma

Hodgkin's Disease

role of the Reed Sternberg cell in the malignant process.
demonstrate knowledge of the historical approaches to diagnosing and managing patients with Hodgkin's disease
Ann Arbor Staging System

Histiocytic and Dendritic Cell Neoplasms

Langerhans cell histiocytosis and the other histiocyte disorders.
Mastocytosis

Head and Neck/Lung

Lung Cancer

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   b. Non-small-cell histology and biology
   (1) Adenocarcinoma
   (a) Bronchioalveolar

   (2) Squamous cell
   (3) Large-cell

   c. Small-cell histology and biology
   d. Risk factors
   (1) Lifestyle
   (a) Active and passive smoking

   (2) Environmental
   (a) Asbestos
   (b) Radon
   (c) Other

   e. Genetic and molecular markers

3. Prevention
   a. Smoking cessation
   b. Chemoprevention

4. Screening
5. Diagnosis
    a. Clinical signs and symptoms
    b. Sputum cytology
    c. Imaging
    d. Biopsy
    e. Immunohistochemistry

6. Staging and prognostic factors
    a. Non-small-cell lung cancer (NSCLC)
    (1) TNM system

    b. Small cell lung cancer (SCLC)
    (1) TNM system and/or limited versus extensive

7. Treatment
    a. Non-small-cell lung cancer
    (1) Preoperative evaluation
    (2) Carcinoma-in-situ
    (3) Early-stage disease (stage I, II, III, N0-1)
    (a) Surgery
    (b) Radiation therapy
    (c) Chemotherapy

    (4) Stage IIIA and IIIB
    (a) Combined chemotherapy and radiation therapy
    (b) Surgery

    (5) Stage IIIB (with pleural effusion) and stage IV
    (a) Chemotherapy
        i. First-line
        ii. Second-line
        iii. Third-line and beyond

    (b) Biologic agents
    (c) Isolated metastases
        Small-cell lung cancer
    (1) Limited stage
    (a) Combined chemotherapy and radiation therapy
    (b) Prophylactic brain irradiation
    (c) Solitary pulmonary nodule

    (2) Extensive disease
    (a) First-line chemotherapy
    (b) Second-line treatment
    (c) Treatment of brain metasteses

8. Follow-up
    a. ASCO and other guidelines

9. Supportive care
    a. Pulmonary rehabilitation post resection and/or radiation therapy

10. Other/Special issues
    a. Bronchoalveolar carcinoma
    b. Pancoast tumors

V. Mesothelioma (pleural)

1. Epidemiology
    a. Incidence rates
    b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
    a. Pathology
    (1) Epithelioid
    (2) Sarcomatoid
    (3) Mixed

    b. Risk factors
    (1) Asbestos

3. Prevention
    a. Decrease occupational exposure

4. Diagnosis
    a. Signs and symptoms
    b. Imaging
    c. Cytology
    (1) Effusion

    d. Biopsy
    (1) Thoracoscopy

5. Staging and prognostic factors
    a. International Mesothelioma Interest Group

6. Treatment by stage
    a. Stage I
    (1) Extrapleural pneumonectomy
    (2) Adjuvant chemotherapy
    (3) Adjuvant radiation therapy

    b. Unresectable disease
    (1) Rad iation therapy

(2) Chemotherapy
(3) Combination chemoradiotherapy

c. Recurrent and metastatic disease
(1) Chemotherapy
(2) Radiation therapy

7. Supportive care
   a. Management of effusions

8. Special issues
   a. Peritoreal mesothelioma
   (1) Presentation and diagnosis
   (2) Pathology
   (3) Treatment

Benign mesotheliomas

Q. Head and Neck Cancers

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   (1) Squamous cell
   (2) Adenomatous
   (3) Other

   b. Genetic and molecular factors
   (1) First-degree relatives

   c. Lifestyle
   (1) Tobacco
   (2) Alcohol

   d. Field cancerization
   e. Viral factors
   (1) HPV
   (2) EBV

3. Prevention
   a. Tobacco cessation
   b. Alcohol cessation

4. Screening
   a. Oral examination

5. Diagnosis
    a. Clinical signs and symptoms
    (1) Head and neck examination
    (a) Oral examination

    b. Endoscopy and biopsy
    (1) Primary lesion
    (2) Nodal sites

    c. Imaging

6. Staging and prognostic factors
    a. TNM system

7. Treatment
    a. General principles
    (1) Surgery
    (a) Organ preservation strategies
    (b) Postradiation neck dissection

    (2) Radiation therapy
    (3) Chemotherapy
    (4) Combined modality

    b. Specific sites
    (1) Hypopharynx
    (2) Larynx
    (3) Nasal cavity
    (4) Nasopharynx
    (5) Oral cavity
    (6) Oropharynx
    (7) Paragangliomas

    c. Nasopharyngeal tumor
    d. Locally recurrent disease
    e. Nodal presentation
    f. Metastatic disease

8. Follow-up
    a. Second malignancies

9. Supportive care
    a. Dental care
    b. Enteral and parenteral nutrition
    c. Radioprotectants

(1) ASCO clinical practice guidelines

d. Rehabilitation
(1) Speech
(2) Swallow
(3) Voice

e. Disfigurement and dysfunction

AG. Thymomas and Thymic Cancer

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Pathology

3. Risk factors
4. Diagnosis
   a. Clinical signs and symptoms
   (1) Associated systemic syndromes
   (a) Autoimmune/immune (ie, myasthenia gravis)
   (b) Endocrine
   (c) Other

   b. Imaging
   c. Biopsy

5. Staging and prognostic factors
   a. TNM system
   b. Resectable versus nonresectable
   c. Prognostic factors

6. Treatment by stage
   a. Localized disease
   (1) Surgery
   (2) Radiation therapy
   (3) Chemotherapy
   (4) Combined-modality therapy

   b. Recurrent or metastatic disease
   (1) Surgery
   (2) Radiation therapy
   (3) Chemotherapy

AH. Thyroid Cancer

1. Epidemiology
    a. Incidence rates
    b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
    a. Pathology
    (1) Papillary carcinoma
    (2) Follicular carcinoma
    (3) Anaplastic carcinoma
    (4) Medullary carcinoma

    b. Genetics and genetic syndromes
    (1) Familial medullary cancer/multiple endocrine neoplasia (MEN)
    (2) RET proto-oncogene in medullary thyroid cancers
    (3) K-ras in radiation therapy-induced cancers

    c. Assessment of risk
    (1) Family history
    (a) MEN syndromes
    (b) Familial adenomatous polyposis
    (c) Cowden's Disease

    (2) Radiation exposure

3. Diagnosis
    a. Evaluation of a thyroid nodule
    b. Imaging studies
    c. Biopsy
    (1) Use of FNA

    d. Calcitonin stimulation testing

4. Screening
    a. Genetic testing for medullary thyroid cancer
    b. Calcitonin stimulation of high-risk family members

5. Staging
    a. TNM staging

6. Treatment
    a. Well-differentiated cancers
    (1) Partial or complete thyroidectomy with/without lymph node
    (2) Role of I^{131} (iodine 131)

    b. Anaplastic cancers
    (1) Thyroidectomy and lymph node dissection

(2) Surgery for maintenance of airway
(3) Doxorubicin and external beam radiation therapy

c. Medullary thyroid cancer
(1) Thyroidectomy and lymph node dissection
(2) Resection guided by venous sampling after calcitonin stimulation

7. Follow-up
   a. Determination of thyroid hormone status
   b. Hypocalcemia after total thyroidectomy

8. Supportive care
   a. Thyroid and calcium supplementation

AI. Unknown Primary Site

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Histologic types
(1) Undifferentiated malignancy
(2) Undifferentiated carcinoma
(3) Small blue cell tumor
(4) Adenocarcinoma
(5) Squamous cell carcinoma
(6) Germ cell tumor

b. Diagnostic techniques
(1) Immunohistochemical stains
(2) Molecular pathology
(3) Electron microscopy

c. Metastatic patterns predictive of potentially curable diseases

3. Diagnostic evaluation
   a. History and physical examination
(1) Source of the unknown primary

b. Laboratory
(1) Sensitivity and specificity of tumor markers in predicting the source of an unknown primary tumor

c. Imaging
(1) PET
(2) MRI
(3) CT

(4) Nuclear medicine

d. Specific tumor characteristics that suggest the primary site

4. Treatment
   a. Surgery
   b. Chemotherapy-responsive tumors
   c. Radiation therapy

GU/Skin/Sarcoma/CNS Tumors

H. Central Nervous System Malignancies

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Histologic types
   (1) Progression from low-grade to high-grade tumors
   (2) Cell type
   (3) WHO grading system

   b. Genetic syndromes
   c. Environmental factors

3. Diagnosis
   a. Clinical symptoms and signs
   b. Imaging
   (1) CT/MRI
   (2) Magnetic resonance spectroscopy
   (3) PET/single-photon emission computed tomography

4. Staging and prognostic factors
   a. Staging
   (1) Radiographic
   (2) CSF evaluation

   b. Prognostic factors
   (1) Functional neurologic status
   (2) Tumor histology
   (3) Patient age
   (4) Extent of tumor resection
   (5) Tumor location
   (6) Biogenetic markers

5. Treatment of primary CNS tumors
   a. Low-grade astrocytoma

(1) Surgery
(2) Observation
(3) Immediate treatment
(a) Astrocytoma

(4) Radiation therapy

b. Malignant astrocytomas
(1) Surgery
(2) Radiation therapy
(3) Chemotherapy
(a) Systemic
(b) Intracavitary

c. Malignant oligodendrogliomas
(1) Surgery
(2) Chemotherapy
(a) Predictive factors

(3) Radiation therapy

d. Meningiomas
(1) Observation
(2) Surgery
(3) Radiation therapy
(4) Other

e. Primary CNS lymphomas
(1) Stereotactic biopsy
(2) Chemotherapy
(a) Intrathecal
(b) Systemic

(3) Radiation therapy

f. Medulloblastoma
(1) Surgery
(2) Neuraxis radiation therapy
(3) Chemotherapy

g. Ependymoma
h. h. Pinealoma
i. i. Metastases to CNS
(1) Brain
(a) Whole brain radiation therapy

(b) Focal brain radiation therapy
(c) Surgery
(d) Chemotherapy

(2) Leptomeninges
(a) Radiation therapy
(b) Chemotherapy
i. Intrathecal
1. Access devices

ii. Systemic

6. Follow-up
   a. Serial imaging

7. Supportive care
   a. Corticosteroids
   b. Anticonvulsants
   c. Deep vein thrombosis
   d. Pneumocystis carinii pneumonia prophylaxis
   e. Radiation toxicity
(1) Neurocognitive
(2) Radionecrosis

O. Germ Cell Tumors

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Pathology
(1) Seminoma
(2) Nonseminoma

   b. Genetics and molecular characteristics
(1) Kleinfelter's syndrome

   c. Risk factors
(1) Cryptorchism

   d. Location
(1) Testes
(2) Pineal
(3) Mediastinum
(4) Retroperitoneum

3. Diagnosis
    a. Clinical signs and symptoms
    b. Imaging
    c. Molecular markers
    d. Biopsy
    e. Serum markers

4. Staging and prognostic factors
    a. TNM, International Germ Cell Consensus Classification, other systems
    b. Histologic type
    c. Serum markers
    d. Clinical Versus surgical staging

5. Treatment
    a. Management of testicular mass
    (1) Inguinal orchiectomy

    b. Seminoma
    (1) Stage 1 disease
    (a) Surgery
    (b) Radiation therapy

    (2) Stage II disease
    (a) Surgery
    (b) Radiation therapy
    (c) Chemotherapy

    (3) Stage III disease
    (a) Surgery
    (b) Radiation therapy
    (c) Chemotherapy

    (4) Metastatic or recurrent disease
    (a) Chemotherapy
    (b) Surgery

    c. Nonseminoma
    (1) Stage 1 disease
    (a) Surgery

    (2) Stage II disease
    (a) Chemotherapy

    (3) Stage III disease
    (a) Chemotherapy

(4) Metastatic or recurrent disease
(a) Chemotherapy

(5) Late relapse

d. Management of residual disease
e. Observation
f. Surgery
g. Radiation therapy

6. Follow-up
   a. Tumor markers
   b. Imaging studies in patients treated by observation

7. Supportive care
   a. Fertility and sexuality issues
   b. Gynecomastia

8. Special issues
   a. Growing teratoma
   b. False-positive serum markers
   c. Tumor sanctuary sites (CNS, testes)
   d. Secondary malignancies
   e. Non–germ cell testicular tumors

AB. Penile Cancer

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   b. Human papilloma virus (HPV)
   c. Circumcision
   d. Premalignant lesions
   e. Lifestyle factors

3. Prevention
   a. Lifestyle changes
   (1) Sexual practices

   b. Circumcision

4. Screening
   a. Identity premalignant lesions

5. Diagnosis
    a. Clinical signs and symptoms
    b. Biopsy

6. Staging
    a. TNM system
    b. Prognostic factors

7. Treatment by stage
    a. Treatment of the primary lesion
    (1) Surgery
    (2) Surgery with radiation therapy

    b. Management of regional nodes
    (1) Sentinel node evaluation

    c. Metastatic or recurrent disease
    (1) Chemotherapy

8.
9. Supportive care
    a. Sexuality
    b. Ureteral stenosis

AC. Prostate Cancer

1. Epidemiology
    a. Incidence rates
    b. Mortality rates
    c. Differences among ethnic groups
    d. Genetic abnormalities
    e. Age distribution

2. Pathogenesis, pathology, and tumor biology
    a. Pathology
    (1) Prostatic intraepithelial neoplasia

    b. Genetic factors
    (1) Family history

    c. Risk factors
    (1) Established risk factors
    (2) Dietary factors

3. Prevention
    a. Chemoprevention
    (1) Finasteride

b. Dietary factors

4. Screening
   a. PSA
   (1) PSA velocity
   (2) Free PSA

   b. Digital rectal examination
   c. Transrectal ultrasound

5. Diagnosis
   a. Clinical signs and symptoms
   b. Digital rectal examination
   c. PSA versus modifications of PSA (ie, free PSA)
   d. Transrectal ultrasound guided biopsy
   e. Imaging

6. Staging and prognostic factors
   a. TNM system
   b. Prognostic factors
   (1) Gleason grading
   (2) DNA analysis by flow cytometry
   (3) PSA
   (4) Predictive models for organ-confined versus nonorgan confined disease

7. Treatment by stage
   a. Organ confined
   (1) Observation
   (2) Radiation therapy
   (a) External beam
   (b) Brachytherapy
   (c) Radioactive seeds

   (3) Surgery
   (4) Cryosurgery
   (5) Hormonal therapy
   (a) Neoadjuvant
   (b) Adjuvant
   Rising PSA level
   (1) Guideline - prostate specific antigen working group
   Locally recurrent
   (1) Surgery
   (2) Radiation therapy
   (3) Hormonal therapy

   b. Metastatic disease

(1) Surgery
(2) Radiation therapy
(3) Hormonal therapy
(a) Early versus delayed
(b) Antiandrogen
(c) Gonadatrophin releasing hormone agonists
(d) "Maximal" androgen blockade
(e) Other

(4) Chemotherapy
(5) Bisphosphonates
(6) Radiopharmaceuticals

8. Follow-up
    a. PSA
    b. Imaging techniques
    (1) Bone scan
    (2) Prostascint scan

9. Supportive care
    a. Sexual function
    b. Urinary incontinence
    c. Proctitis/diarrhea
    d. Urinary frequency
    e. Osteoporosis
    f. Hot flashes

10. Special issue
    a. Small-cell carcinoma

AD. Renal Cell Cancer

1. Epidemiology
    a. Incidence rates
    b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
    a. Pathology
    b. Genetic factors
    (1) Chromosomal abnormalities
    (2) Von Hippel-Lindau
    (3) Li-Fraumeni

    c. Risk factors
    (1) Family history
    (2) Tobacco use
    (3) Environmental exposures
    (4) Occupation exposures

3. Prevention
    a. Lifestyle changes
    (1) Smoking cessation

    b. Monitoring of those at increased risk
    (1) First-degree relatives
    (2) Genetic syndromes

4. Screening
    a. Familial and genetic aspects
    b. Increased detection on CT scans performed for other purposes

5. Diagnosis
    a. Classic signs and symptoms
    b. Imaging
    c. Surgery

6. Staging and prognostic factors
    a. TNM system
    b. Prognostic factors
    (1) Histology

    c. Prognostic factors with metastatic disease

7. Treatment by stage
    a. Localized disease
    (1) Surgery
    (2) Management of vena cava involvement

    b. Metastatic disease
    (1) Surgery
    (2) Biologic response modifiers
    (a) Interleukin-2
    (b) Interferon
    (c) Newer cytokines

8. Follow-up
9. Supportive care
10. Other/special issues
    a. Bilateral renal tumors
    b. Wilms' tumor
    c. Oncocytoma
    d. Collecting system tumor
    a. Unresectable/locally advanced disease

b. Metastatic disease

2. Other/special issues
   a. Paraneoplastic syndromes
   (1) Pure Red Cell Aplasia
   (2) Myasthenia Gravis

AF. Soft Tissue Sarcomas

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Histologic subtypes
   (1) Fibrosarcoma
   (2) Leiomyosarcoma
   (3) Rhabdosarcoma
   (4) Angiosarcoma
   (5) GIST (gastrointestinal stromal tumors)
   (6) Other

   b. Cytogenetics

3. Risk factors
   a. Genetic syndromes
   (1) Li-Fraumeni syndrome
   (2) Neurofibromatosis type I
   (3) Retinoblastoma
   (4) Gardner's syndrome
   (5) Werner's syndrome
   (6) Gorlin's syndrome

   b. Environmental exposure
   (1) Vinyl chloride
   (2) Radiation

   c. Lymphedema
   d. Human herpes virus

4. Diagnosis
   a. Clinical signs and symptoms
   b. Biopsy
   c. Imaging
   d. Chromosomal signatures/gene mutations

5. Staging and prognostic factors
   a. AJCC staging system

b. Prognostic factors
(1) Histologic subtype
(2) Patient age
(3) Primary site
(4) Molecular markers

6. Treatment
a. Localized primary disease
(1) Surgery
(a) General issues
(b) Amputation
(c) Combined modality limb-sparing treatment

(2) Radiation therapy
(a) Essential elements in treatment planning
(b) Preoperative
(c) Postoperative

(3) Chemotherapy
(a) Adjuvant
(b) Neoadjuvant
(c) Intraarterial administration
(d) Hyperthermia and limb perfusion

b. Local recurrence
(1) Surgery
(a) Dermatofibrosarcoma protuberans

c. Metastatic disease or distant recurrence
(1) Surgery
(2) Chemotherapy
(a) Single agent
(b) Combination

(3) Radiation therapy

7. Follow-up

8. Other/special issues
a. GIST

E. Bladder and Other Urothelial Cancers (ureter, renal, pelvis)
1. Epidemiology
a. Incidence rates
b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
    a. Pathology
    b. Lifestyle and environmental exposures
    (1) Cigarette smoking
    (2) Phenacetin
    (3) Schistosomiasis infection
    (4) Chemical exposure

    c. Field change in urothelium
    d. Genetic and molecular abnormalities

3. Prevention
    a. Smoking cessation
    b. Environmental (OSHA) protection
    c. Monitoring medication use

4. Screening
    a. Urine cytology
    b. CT/MRI

5. Diagnosis
    a. Urine cytology
    b. Cystoscopy and biopsy
    c. CT/MRI scanning

6. Staging and prognostic factors
    a. TNM system, tumor grading
    b. Localized versus invasive disease
    c. Histologic type

7. Treatment by stage
    a. Superficial bladder cancer
    (1) Intravesical

    b. Early-stage and locally advanced
    (1) Surgery
    (2) Radiation therapy
    (3) Chemotherapy
    (a) Neoadjuvant
    (b) Adjuvant

    (4) Combination therapy for organ preservation

    c. Recurrent and metastatic
    (1) Surgery
    (2) Radiation therapy

(3) Chemotherapy
(a) Neoadjuvant
(b) Adjuvant
(c) Concurrent with radiation

Follow-up
d. Urine cytology
e. Cystoscopy
f. Imaging

8. Supportive care
a. Urinary diversion
(1) Ileal conduit
(2) Continent urinary diversions

9. Special issues
a. Urachal carcinoma

F. Bone Sarcomas

1. Epidemiology
a. Incidence rates
b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
a. Pathology
(1) Histologic types
(a) Osteosarcoma
(b) Chondrosarcoma
(c) Ewing's
(d) Other

b. Cytogenetics and genetic syndromes
(1) Li-Fraumeni syndrome
(2) Retinoblastoma
(3) Chromosomal signatures/gene mutations

c. Radiation

3. Diagnosis
a. Clinical presentation
b. Radiologic-pathologic correlations
c. Biopsy
d. Special considerations

4. Staging and prognostic factors
a. Staging: TNM and tumor grade

b. Prognostic factors
c. Radiographic evaluation
d. Restaging after preoperative chemotherapy

5. Treatment
   a. Localized primary disease
   (1) Osteosarcoma
   (2) Chondrosarcoma
   (3) Ewing's
   (4) Other
   (5) Limb sparing treatment

   b. Local recurrence
   c. Metastatic disease
   (1) Clinical presentation
   (2) Surgical resection
   (3) Chemotherapy

6. Follow-up
   a. Radiographic evaluation

U. Melanoma

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   (1) Dysplastic nevi
   (2) Melanoma in situ
   (3) Invasive melanoma

   b. Risk factors
   (1) Skin type
   (2) Precursor lesions
   (3) Sun exposure
   (4) Family history (affected relatives)

   c. Genetics - p16 mutations
   (1) CDKN2A, MTS-1
   (2) CDK4
   (3) FAMM (DNS)

3. Prevention
   a. Lifestyle changes
   (1) Sun avoidance

b. Use of sunscreen

4. Screening
   a. Skin examination
   b. Genetic testing and genetic counseling

5. Diagnosis
   a. Clinical signs and symptoms
   (1) ABCD of melanoma identification

   b. Biopsy of suspicious lesion (excisional versus incisional versus shave)
   c. Imaging

6. Staging and prognostic factors
   a. TNM system
   b. Location of primary

7. Treatment by stage
   a. Melanoma in situ
   (1) Surgery

   b. Invasive melanoma
   (1) Surgery
   (a) Wide local excision
   (b) Sentinel node mapping

   (2) Adjuvant therapy
   (a) Interferon
   (b) Vaccines

   (3) Estimating the benefits of adjuvant therapy

   c. Regional nodal metastasis/in-transit metastasis
   (1) Surgery
   (2) Adjuvant therapy
   (a) Interferon
   (b) Other
   (c) Limb perfusion

   d. Metastatic disease
   (1) Surgical resection (solitary metastasis)
   (2) Chemotherapy
   (3) Biologic therapies
   (a) Interferon
   (b) Interleukin-2

(4) Biochemotherapy
(5) Radiation therapy

8. Follow-up
    a. National Comprehensive Cancer Network (NCCN) guidelines

9. Supportive care
    a. Lymphedema

10. Other/special issues
    a. Unknown primary
    b. Mucosal primary
    (1) Oral
    (2) Anorectal
    (3) Vaginal/vulvar

    c. Ocular primary

Patient Care

Management of chemotherapy
1. Indications and goals
    a. Primary cancer
    b. Recurrent cancer

2. Pharmacology
    a. Pharmacokinetics
    b. Pharmacodynamics
    c. Metabolism and clearance
    d. Pharmacogenomics
    e. List of drugs

3. Dose and schedule
    a. Metronomic
    b. Dose-density
    c. Dose-intensity
    d. High-dose
    e. Other

4. Cancer drug development and testing
5. Drug resistance
6. Predicting response and toxicity

Hormonal Therapy
1. Estrogens

2. Selective estrogen response modifiers
3. Progestins and antiprogestins
4. Aromatase inhibitors
5. Androgens and antiandrogens
6. Gonadotropin-releasing hormone analogs
7. Glucocorticoids
8. Miscellaneous agents

Biologic and Targeted Therapy

1. Basic concepts of targeted molecular therapies
2. Monoclonal antibodies
3. Tumor vaccines
4. Cellular therapy
5. Antiangiogenic agents
6. Cytokines
7. Gene-directed therapy

Management of the following complications of malignancy and chemotherapy:

-Fatigue
-Depression
- Neuropathy
-Hot flashes
-Pain control
-Chemotherapy induced nausea, vomiting, and diarrhea
-Chemotherapy extravasation
-Premedications for chemotherapy
-Infusion reactions
-Bone metastases

Professionalism

Interact respectfully with nursing staff, scheduling staff, patients and families
Respect patient confidentiality

Communication

Prognosis
Treatment options
Patient's goals of care
Cancer recurrence
Shifting treatment goals

Delivering Bad News

1. Patient's coping skills
2. Support to family
3. Preference for end-of-life care
    a. Explaining advanced directives

Cross Cultural Issues
.Multidisciplinary Teams
Communicating within the team

Systems Based Learning

Understand the role of hospice and palliative care in patient management
Understand visiting nurse services available for home chemotherapy infusions
Understand the financial implications of chemotherapy for the patient

Practice Based Learning

Present newly diagnosed patients at multidisciplinary tumor board (disease specific)
Understand what clinical trials are available for a given patient
Use information resources and technology to enhance patient care