Objectives

- Review pathophysiology of GI systems
- Discuss risk factors
- Discuss presenting signs and symptoms
- Discuss and identify current treatment options
- Review side effects and nursing management
Esophageal Cancer

Anatomy and Function

- Located behind the trachea and the heart, in front of the spine
  - Located from C6 - T10
- Starts at thoracic inlet, ending at GE junction
  - Passes through the diaphragm
  - Muscular tube 10-13 inches long
- Moves food from the mouth to the stomach
  - Using peristalsis and sphincters
  - Take about 8 to 10 sec
- Two sphincters help control passage
  - Upper esophageal and Lower esophageal

Types of Esophageal Cancer

- Squamous cell carcinoma (SCC)
  - Originate from mucosal layer
  - Occurs in mid to upper esophagus
  - 90% used to be SCC now < 30%
  - More common in black men than white
    - Diagnosis happens about 10 to 15 yrs earlier
  - Continue to increase in areas like Iran, China, India and southern Africa

Esophageal Anatomy

- Mucosa – two components
  - Epithelial layer – squamous cells
  - Lamina layer – connective tissue
- Sub mucosa
  - Glandular layer
- Muscularis Propria
  - Muscle layer
- Adventia
  - Connective tissue layer
- Lymph Nodes
Types of Esophageal Cancer

- Adenocarcinoma
  - Originate from glandular cells of sub mucosa
  - Squamous cells are replaced by glandular cells
  - Usually occurs near the stomach
  - Increasing about 1% a year in white men

Incidence of Esophageal Cancer

- 1% of all cancers diagnosed
- 7th leading cause of death in men
- Falls under other for women
- Lifetime risk
  - 1 in 125 in men and 1 in 435 in women

Risk Factors for Esophageal Cancer

- Age - most cases occur > 65
- Male – 3 to 4x higher in men than women
- Tobacco
  - 44X risk more significant in SCC
- Alcohol – heavy
  - Significant risk in SCC
  - Synergic relationship with smoking
- Obesity/ High BMI
  - More significant in adenocarcinoma

Risk Factors for Esophageal Cancer

- HPV – relationship with SCC
- Diet
  - Diet low in fruits and vegetables
  - Drinking hot fluids frequently
  - Diet high in processes meats (high salt), pickled vegetables
  - Decline of h. pylori in esophagus
- Achalasia – failure of smooth muscle movement
- Tylosis – rare inherited disease causes papillomas to form in esophagus
  - Pt need to be monitored regularly
Presenting Signs & Symptoms

- Asymptomatic in early stage
- Late Symptoms
  - Circumference of esophagus less than 13mm
  - Difficulty/painful swallowing
  - Weight loss
  - Chest or Epigastric Pain
  - Hoarse Voice
  - Hiccups
  - Hematemesis
  - Melena
- No screening tests available in US

Risk Factors for Esophageal Cancer

Barrett’s Esophagus
- 10% of people with GERD have Barrett’s
  - GERD asst with high BMI
- Squamous cells replaced with glandular cells – starts at Zline
  - 30-125 times increased risk of adenocarcinoma
- Cancer risk higher when there is dysplasia
- Endoscopy every 3 years

Diagnostic Work-up

Initial diagnostic exams
- Barium Swallow
- Endoscopy and Biopsy

Staging exams
- CT chest and abdomen
- Bronchoscopy
- PET scan
- MRI
- Bone scan
- Laparoscopy

Endoscopic Ultrasound
- Identifies unseen tumors and depth of tumors
- Can do biopsies
  - Even of lymph nodes
Metastatic Patterns

- Local Spread through esophageal layers
  - Lymph Nodes
  - Surrounding organs
- Distant Metastases – most common
  - Liver
  - Lung & Pleura
  - Stomach
  - Peritoneum

NCCN Esophageal Staging

- TNM used
  - Plus grade for esophageal
    - Grade = pattern cells look like under microscope
    - Makes difference in early stages
- Squamous vs Adenocarcinoma
  - Squamous staging adds location
    - Upper, Mid, Lower

Staging

<table>
<thead>
<tr>
<th>Staging</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX</td>
<td>Primary tumor cannot be assessed.</td>
</tr>
<tr>
<td>T0</td>
<td>No evidence of primary tumor.</td>
</tr>
<tr>
<td>Tis</td>
<td>High-grade dysplasia.</td>
</tr>
<tr>
<td>T1</td>
<td>Tumor invades lamina propria, muscularis mucosae, or submucosa.</td>
</tr>
<tr>
<td>T1a</td>
<td>Tumor invades lamina propria or muscularis mucosae.</td>
</tr>
<tr>
<td>T1b</td>
<td>Tumor invades submucosa.</td>
</tr>
<tr>
<td>T2</td>
<td>Tumor invades muscularis propria.</td>
</tr>
<tr>
<td>T3</td>
<td>Tumor invades adventitia.</td>
</tr>
<tr>
<td>T4</td>
<td>Tumor invades adjacent structures.</td>
</tr>
<tr>
<td>T4a</td>
<td>Resectable tumor invading pleura, pericardium, or diaphragm.</td>
</tr>
<tr>
<td>T4b</td>
<td>Unresectable tumor invading other adjacent structures, such as aorta, vertebral body, trachea, etc.</td>
</tr>
</tbody>
</table>

Nodes

- Nx = unable to assess LN
  - N0 = no LN
  - N1 = 1-2 LN
  - N2 = 3-6 LN
  - N3 = >7 LN

Metastatic Sites

- M = # of sites

5 Year Survival Rates

- Localized disease survival rate is 37%
- Regional staged is 19%
- Distant metastasis 3%
- Overall 5 year survival is 20%
- Survival rates doubled last 40 years but remain poor
  - 1960 and 1970 5 years survival was 5%
NCCN Treatment Guidelines

• Surgery alone
  – Early stages only
  – + nodes in 25% of surgical case with no prior evidence
  – Esophageal Ca spreads early
  – Laproscopy for staging

• Chemoradiation – Gold standard!
  – Neoadjuvant and adjuvant
  – Definitive if not a surgical candidate

• Chemotherapy
  – Pre and postoperative early stages
  – Used alone in locally advanced SCC
    • Watch and wait

• Radiation – alone
  – Tumor is locally advanced and pt not surgical candidate
  – Palliative for symptom management

Radiation

• External Beam
• Brachytherapy
• Proton Therapy
• VMAT
• SBRT

Chemotherapy

• Combination Chemotherapies most common
  • Xeloda or 5-FU
  • Cisplatin
  • Irinotecan
  • Oxaliplatin
  • Carboplatin
  • Paclitaxel
  • Docetaxel
  • Taxetere

• Locally advanced or metastatic setting –
  • Trastuzumab - Her2NEU+
  • Ramucirumab
  • Lapatinib
  • Erlotinib
  • Gefitinib

• 2 drug regimens most common with Radiation
• 3 drug regimens most common when Radiation is not indicated
Surgery - Esophagectomy

- Surgery involves
  - Removal of affected esophagus
  - Possible proximal stomach depending on proximity of tumor to GE junction

- Tumors in upper to middle esophagus, most of the esophagus is removed

Esophagectomy

- Two approaches
  - Transthoracic
    - Abdominal and thoracic incisions
    - Cervical incision
  - Transhiatal
    - Abdominal and cervical incisions

- Less invasive approaches
  - Using VATS
  - Laparoscopy

- Both accompanied by LN removal in the neck, stomach and mediastinum

Transthoracic

Transhiatal

NCCN Treatment Guidelines

- Tumor can be non-resectable
  - Close to cricopharyngeal muscle also known as the upper esophageal sphincter
  - Extensive EGJ involvement
  - Bulky tumor that involves surrounding organs
  - Bulky lymphadenopathy
  - Distant mets
**Nursing Management**

**Post Surgical care**
- Pneumonia
- Obstruction or paralytic ileus
- Bleeding
- Anastomosis Leakage
  - Mediastinitis if in thoracic region
- Blood clots
- Infection
- Pain management
- Recurrent laryngeal nerve paralysis (cervical sites)

**Later phase surgical issues**
- Gastroparesis - nerve of stomach affected by surgery
- Chronic nausea/vomiting
- Dumping syndrome
- Strictures – at anastomosis sites
- Heartburn - due to loss of lower sphincter

**Nutrition**
- Most patients will have a PEG or J-tube tube placed
- Patient are going to have to learn to eat different
  - Nutrition consult and continued follow up

---

**Palliative Therapy**
- Esophageal Dilatation
- Esophageal Stents
- Laser Endoscopy
- Cryotherapy
- Electrocoagulation
- PEG or PEJ placement

**Treatment**

**Photodynamic Therapy**
- Used on superficial and mucosal lesions

**Procedure**
- Given photosensitizing agent
  - Wait 24 to 72 hrs
- Via endoscopy
  - Special laser is pointed at cancer cells causing cell death
- Little harm to normal cells
- Patients need to stay inside for 4-6 weeks
Summary – Esophageal cancer

- Overall 5 yrs survival is 20%
- Only accounts for 1% of overall cancer diagnosed but remains one of the deadliest
- Males higher risk than women
- Tobacco/Alcohol significant risk in SCC
- GERD significant risk in Adenocarcinoma
- Healthy weight and active lifestyle best defense
- Adenocarcinoma increasing in white men
- SCC decreasing in US but still significant problem worldwide

Colorectal Cancer

Anatomy and Function

- Primary Function is water and mineral absorption along with stool formation.
- Colon is approx. 5 to 6 ft long
- Rectum is 10 to 12 inches long
- 70% of tumor occurrences are in the colon and 30% are in the rectum.

Incidence of Colorectal Cancer

- 3rd leading cause of cancer death men and women
- Lifetime risk 1/20
- New studies show alarming increase in young adults
  - 1% colon cancer increase in adults 30-39
  - 2.4% colon cancer increase in adults age 20-29
  - 4% increase in rectal cancer in young adults
    - Median age for young adult diagnosis is 44
- Colon cancer has decreased in last 20 years due to screening
  - Especially in the 55 and older age group
  - Over 1.5+ million survivors of colorectal cancer in US
Risk Factors

- Age over 50 – 90% of all CRC
  - Average age 72
- Obesity - especially abdominal obesity
  - High fat and red meat
  - Diets high in nitrates
- Pernicious anemia
- Diabetes – 30% inc risk and poor prognosis
- Smoking/Alcohol

Risk Factors

- African Americans 20% higher incidence, 45% higher mortality
- Inflammatory Bowel Disease: Crohn’s, Ulcerative colitis
- Previous cancerous polyps
- First degree relative diagnosed 55 years old or younger – 2 to 3 times higher risk
  - 25% of people diagnosed have a family history

Risk Factors

- Familial Adenomatous Polyposis (FAP)
  - 1% of CRC
  - Also known as Gardners Syndrome
  - APC gene mutation
  - Hundreds of polyps by mid 20’s
    - Offer colectomy
  - Not necessarily just located in colon and rectum
  - 100% lifetime risk of CRC
  - Autosomal dominant

Risk Factors

- Hereditary Nonpolyposis Colorectal Cancer (HNPCC)
  - 3-5% of CRC
  - Also known as Lynch Syndrome
  - Mismatch repair gene mutation
  - Average age of onset is 44
  - 70-80% lifetime risk of CRC
  - Women have very high risk of endometrial cancer
  - Increased risk of other cancers
Human colon carcinogenesis progresses by the dysplasia/adenoma to carcinoma pathway

How long do you think this pathway takes?

Screening Guidelines

- Screening should begin at the age of 50—If there is no previous history of polyps or cancer
- Tests that find polyps and cancer
  - Flexible sigmoidoscopy every 5 years, or
  - Colonoscopy every 10 years, or
  - Double-contrast barium enema every 5 years, or
  - CT colonography (virtual colonoscopy) every 5 years

Screening Saves LIVES

- 1/3 of Americans are not up to date on screening
- 23 million have not been screened
- 60% of CRC could be prevented with screening
- 30% decrease in mortality with screening

Screening Guidelines

- Tests that primarily find cancer
  - Yearly fecal occult blood test (gFOBT), or
  - Yearly fecal immunochemical test (FIT) every year, or
  - Stool DNA test (sDNA) every 3 years
  - sDNA test most effective stool test
  - 87% as effective as colonoscopy
  - Dysplastic mass
    - sDNA 60% effective
    - FIT/FOBT 46% effective
  - Surgically curable disease (stage I+II)
    - sDNA 94% effective
    - FIT/FOBT 70%
### Presenting Symptoms - Generalized
- Persistent abdominal discomfort
- Changes in bowel habits (over several weeks)
- Rectal bleeding/Blood in the stool
- A feeling that your bowel doesn't empty completely
- Unexplained weight loss
- Fatigue
- Anemia

### Presenting Symptoms – Location

**Ascending**
- Large bulky tumor
- Palpable mass uncommon
- Dull pain
- Tarry dark stool

**Late Symptoms:**
- Obstruction

**Transverse**
- Palpable mass
- Occult blood in stool
- Obstruction

**Sigmoid**
- Constipation
- Pencil-like stool
- Tenesmus

**Descending**
- Maroon colored in stool
- Incomplete stool evacuation
- Obstruction
- Tenesmus

### Presenting Symptoms - Rectal
- Mucous discharge/diarrhea
- Bright red rectal bleeding (most common)
- Tenesmus – spasmodic contraction
- Sense of incomplete evacuation

**Late Symptoms:**
- Feeling of rectal fullness
- Constant ache

### Diagnostic & Lab Procedures
- Barium Enema
- CAT Scan/PET Scan
- Colonoscopy, Sigmoidoscopy, Protoscopy
- MRI
- Hematocrit
- Liver Function Tests
- Carcinoembryonic Antigen (CEA) or CA 19-9
  - Monitor for response to therapy and recurrence – not presence of cancer
Metastatic Patterns

- Local extension through penetration of layers of bowel
- Invasion of submucosal layer: direct access to vascular and lymphatic system
- Distant metastasis: most frequent in liver, then the lungs
- Less frequent in brain, bone and adrenal glands

5 year Survival Rates

- 90% in localized colorectal
- 71% in regional disease
- 13% in disease with distant mets
- Even with all the treatments we have now there has only been a 10 month increase in overall survival

NCCN Treatment Guidelines

- Recommendations for treatment by stage
  - Surgery primary treatment -75% of cases
  - Goal being CURE!
  - Colon cancer
    - Stage I and II surgery only – then watch and wait
    - Stage III and IV – chemo and surgery
  - Rectal cancer
    - Combo chemo, radiation and surgery
    - High rates of recurrence
      - Margins are difficult due to sphincter and nerve preservation
Treatment: Chemotherapy

- Used in combination with surgery
  - Can be adjuvant or neoadjuvant (depending on tumor size or location)
- 5-FU (Xeloda) and Leucovorin combined with:
  - Irinotecan (Camptosar)
  - oxaliplatin (Elokatin),
  - Cisplatin
- Targeted therapy – kras wild type (no mutation)
  - Cetuximab
  - Panitumumab
  - Bevacuzimab – mutation does not matter
  - Can’t have before or right after surgery or other medical procedures
- Most research know is being done on biotherapy
- HIPEC – Hyperthermic intraperitoneal chemotherapy

Treatment- Radiation

- Used in combination with chemo in rectal cancer
- Endorectal brachytherapy
  - Early rectal cancers in low-rectal and mid-rectal regions
  - Early anal cancers
- SBRT – high dose 1 to 5 days
  - ongoing studies
- External Beam radiation
  - Can be before or after surgery in rectal cancer
  - Often combined with chemo
  - Limited use in colon cancer
  - Palliative – symptom management

Treatment: Surgery Colon

- Laprosopic-assited colectomy – early stage colon cancer
- Hemicolecotomy - sometimes many need temporary colostomy -rarely are the permanent
- Debulking – palliative/symptom management – often ends up with colostomy

Treatment: Surgery Rectum

- Early stage surgeries
  - Transanal endoscopic microsurgery
  - Local Transanal Resection

- Surgical procedure determined by location
  - Lower Anterior Resection – lesion in upper third of the rectum
  - temporary ileostomy
Treatment: Surgery Rectum

- **Extended lower anterior resection** – lesion in the middle and lower third of the rectum
  - J-pouch and temporary ileostomy
- **Abdominoperineal (AP) Resection** – lesion in the middle and lower third of the rectum, large and bulky
  - Permanent colostomy

Nursing Management – Post Op

**Post Surgical care**
- Pneumonia
- Obstruction or paralytic ileus
- Bleeding
- Anastomosis Leakage
- Stoma complications
- TPN

**Discharge teaching**
- Ostomy Care
- Self image

**Late surgical complications**
- Poor wound healing
- DVT

New and Exciting Treatments

- **Immunotherapy**
  - Using patients or chimeric T-cells to attack antigens on the surface of the colorectal cancer cells
- Vaccines targeting tumor antigens
- Tumor infiltrating lymphocytes
- Vit D is being studied in recurrent disease
- Probiotic therapy
- An Aspirin a day may decrease risk of developing recurrent colorectal cancer

Summary – Colon cancer

- 3rd leading cause of cancer death
- Most significant risk age & smoking!
- Early detection **SO IMPORTANT**!
  - Get your colonoscopy
- Stage is most significant prognostic indicator
- Surgery is primary treatment
- Cure is the goal!
Pancreatic Cancer

Anatomy of Pancreas

- Pear shaped dual-function gland
- 6 in long/about 15 cm
- Located between stomach and spine
- 3 Parts
  - Head - 78%
  - Body – 11%
  - Tail – 11%
- Tumor more resectable in the head

Function of the Pancreas

- Endocrine Function
  - Islets of Langerhans – produce insulin and glucagon
  - Neuroendocrine tumors originate here
    - 1% of pancreatic cancers

- Exocrine Function
  - Comprised of ducts and acini
  - Enzymes help in digestion
  - 95% pancreas
  - 95% are adenocarcinomas

Incidence of Pancreatic Cancer

- 9th most common cancer in women
- 4th leading cause of cancer deaths
- Numbers are rising
- Lifetime risk 1 in 72
- Higher incidence in African Americans
- At time of diagnosis > 50% have distant mets
- Incidence the same worldwide – developed countries
**Risk Factors**

- Age – 55 and greater
- Smoking – 2 to 3x greater risk
- Obesity
  - Type 2 diabetes
- Cirrhosis of the Liver
- Chronic pancreatitis – often related to smoking
- Helicobacter pylori (H. pylori) infection
- Genetic Syndromes
  - 10% of pancreatic cancers
  - Peutz-Jeghers
  - hamartomatous polyps
  - Hereditary

---

**Presenting Signs & Symptoms**

**Early signs mimic general GI disorders**

**Late Signs**

- Abdominal and back pain
  - Dull and constant
  - Radiates to mid or upper back
  - Worse while supine

- Weight Loss and Poor Appetite
  - Blockage of digestive enzymes
    - Pale, bulky, greasy stool that may float
  - Nausea and vomiting

---

**Presenting Signs & Symptoms**

- Jaundice – usually painless
- DVT/PE – paraneoplastic syndrome
- Fatigue
- Depression
- Ascites

Once there are signs and symptoms the disease is already advanced!!!

---

**Pancreatic Cancer**

**Why so difficult to diagnosis?**

- No physical diagnostic exam that are practical
- No consensus on diagnostic imaging
- No biomarkers available
- No consensus on screening
  - When, why, what for?
### Diagnostic Procedures
- CT
- ERCP - No mass on CT
  - Stent obstruction
  - Biopsies
- Endoscopic Ultrasound (EUS)
- MRCP - If ERCP can’t be done
- Total Bilirubin
- CA 19-9 – not pancreas specific
- Liver Enzymes
- PET scan
- Laparotomy

### Metastatic Pattern
- Local spread/invasion to surrounding tissue and organ
  - Small bowel, CBD, Stomach
- Most common distant metastatic sites
  - Liver
  - Lungs
  - Peritoneum/abdominal cavity

### Staging TNM
- T1 is a tumor < 2cm
- T2 is a tumor > 2cm
- T3 tumor beyond pancreas, major arteries or veins not involved
- T4 tumor involves major arteries and veins

### Staging/TNM Classification

<table>
<thead>
<tr>
<th>Stage</th>
<th>Tumor (T)</th>
<th>Nodes (N)</th>
<th>Metastasis (M)</th>
<th>5 YR Survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 0</td>
<td>Tis</td>
<td>N0</td>
<td>M0</td>
<td>14%</td>
</tr>
<tr>
<td>Stage IA</td>
<td>T1</td>
<td>N0</td>
<td>M0</td>
<td>12%</td>
</tr>
<tr>
<td>Stage IB</td>
<td>T2</td>
<td>N0</td>
<td>M0</td>
<td>7%</td>
</tr>
<tr>
<td>Stage IIA</td>
<td>T3</td>
<td>N0</td>
<td>M0</td>
<td>5%</td>
</tr>
<tr>
<td>Stage IIB</td>
<td>T1</td>
<td>N1</td>
<td>M0</td>
<td>3%</td>
</tr>
<tr>
<td>Stage III</td>
<td>T4</td>
<td>Any N</td>
<td>M0</td>
<td>1%</td>
</tr>
<tr>
<td>Stage IV</td>
<td>Any T</td>
<td>Any N</td>
<td>M1</td>
<td></td>
</tr>
</tbody>
</table>
5 Year Survival Rates

- Overall 1 year survival 29%
- Overall 5 year survival 7%
- With surgery 5 year survival 27%
- Regional or localized spread 5 year survival 11%
- Distant mets at dx
  - 1 year survival 15%
  - 5 year survival 1%

Chemotherapy

- **Chemotherapy** – usually at all stages
  - Gemcitabine and 5FU/Xeloda – Gold standard
  - **proven to be chemo-resistant**
  - Others you may see
    - Xeloda, cisplatin, irinotecan, CPT-11, Taxol, docetaxol, oxaliplatin
- **Targeted Therapy**
  - Erlotinib, Ipilimumab (in trials)
  - Vaccines – against tumor specific antigens
  - PEGPH20 (pegylated recombinant human hyaluronidase)

Chemotherapy

- **Chemotherapy** – usually at all stages
  - Gemcitabine and 5FU/Xeloda – Gold standard
  - **proven to be chemo-resistant**
  - Others you may see
    - Xeloda, cisplatin, irinotecan, CPT-11, Taxol, docetaxol, oxaliplatin
- **Targeted Therapy**
  - Erlotinib, Ipilimumab (in trials)
  - Vaccines – against tumor specific antigens
  - PEGPH20 (pegylated recombinant human hyaluronidase)

Radiation

- **Radiation** – being used more
  - After surgery to help prevent recurrence
  - Tumor too large for surgery
- **Intra-operative Radiation**

Clinical trials

- Drug combination
- Radiation type and length
- Immune therapy

- Current trial with neoadjuvant SBRT/Chemo with Hyperacute Immunotherapy – 80-97% 1 year survival for borderline resectable disease

Hyperacute-Pancreas Immunotherapy
Surgery

- Whipple Procedure (Pancreaticoduodenectomy)
  - Cancer must be contained within the pancreas
  - Only potential cure and only 1 in 10 cases
- A series of three anastomoses are created
- Gastrojejunostomy tube placed
- 5-year survival even with surgery is 20%

Surgery

- Gastrojejunostomy
  - Bypass tumor and attach stomach to jejunum
  - Second anastomoses done from biliary system to jejunum
- A palliative procedure for symptom management

Nursing Management

- Postoperative care
  - Pneumonia
  - Bleeding
  - Infection
  - Anastomotic leaking
  - Blood sugar and electrolyte imbalances
  - TPN
  - Ileus
  - Dumping Syndrome
- Pain control
- Insulin Dependence – surgically induced

Nursing Management

- Malnourishment/Malabsorption
  - Anorexia
  - Nausea
  - Pancreatic insufficiency
  - Blockage
- Interventions
  - Pancreatic enzyme tablets
  - Nutritional consult
  - Feeding tube
Palliation treatment

- Biliary obstruction – in IR or by ERCP
  - Permanent biliary stent
  - Percutaneous biliary stent with drain
- Gastric outlet obstruction
  - Duodenal stent
  - PEG/PEJ tube
  - Gastrojejunostomy

Summary – Pancreatic cancer

- Overall 5 yr survival is 7%
- One of the poorest 5 yr survival rates of any cancer
- Smoking increases risk 3 to 4 fold
- Median survival is 9-12 months
  - After resection 15-19 months
- Treatment for majority pain and symptom management
- Pancreatic cancer has proven to be fairly chemo resistant

Chemotherapy Side Effects

<table>
<thead>
<tr>
<th>Side effect</th>
<th>Management</th>
<th>Drug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mucositis</td>
<td>Good Oral Care</td>
<td>5-FU</td>
</tr>
<tr>
<td></td>
<td>Magic Mouthwash</td>
<td></td>
</tr>
<tr>
<td>Diarrhea</td>
<td>Anti-diarrheal</td>
<td>Irinotecan</td>
</tr>
<tr>
<td></td>
<td>Hydration</td>
<td>5-FU</td>
</tr>
<tr>
<td>Hand Foot Syndrome</td>
<td>Monitor</td>
<td>5-FU/Xeloda</td>
</tr>
<tr>
<td></td>
<td>Patient education</td>
<td>Targeted therapies</td>
</tr>
<tr>
<td>Acne like rash</td>
<td>Monitor</td>
<td>Erlotinib</td>
</tr>
<tr>
<td></td>
<td>Creams/antibiotics</td>
<td>Oxaliplatin</td>
</tr>
<tr>
<td>Thrombocytopenia</td>
<td>Patient Education on risk</td>
<td>Gemcitabine</td>
</tr>
<tr>
<td></td>
<td>and signs and symptoms</td>
<td></td>
</tr>
<tr>
<td>Neurotoxicity (tingling/numbness)</td>
<td>Monitor</td>
<td>Oxaliplatin</td>
</tr>
<tr>
<td></td>
<td>Patient education</td>
<td></td>
</tr>
<tr>
<td>Cold Sensitivity</td>
<td>No cold food</td>
<td>Oxaliplatin</td>
</tr>
<tr>
<td></td>
<td>Scarf in cold weather</td>
<td></td>
</tr>
</tbody>
</table>

Patient Education -Chemotherapy

- Nausea & Vomiting
  - Antiemetic, keeping hydrated and when to call
- Myelosuppression
  - Growth factors, blood transfusion, hand hygiene
- Fatigue
  - > than 99% of patients complaining of fatigue
  - Encourage mild exercise and energy conservation
- Decreased libido
Patient Education - Radiation

- Inflammation of bowel or bladder
- Blood in stool or urine
- Ulceration of GI mucosa – pain
- Necrosis of GI tract
- Skin irritation/burns
- Changes in sexual activity