Gastric Tumors

Dr Muhammad Ibrar Hussain
FCPS (Pak) MRCS (England)
Assistant Professor of Surgery
College of Medicine
Taibah University
Al- Madina Al-Munawara
Learning objectives

- Surgical anatomy of stomach.
- Type of gastric tumors.
- Etiology and risk factors of gastric cancer.
- Classification of gastric carcinoma.
- Presentation of ca stomach.
- Investigation protocol.
- Treatment options.
Blood Supply

- Right gastric artery
- Gastroepiploic artery
- Superior mesenteric artery
- Left gastric artery
- Left gastroepiploic artery
- Right gastroepiploic artery
Nerve Supply
Lymphatic drainage

- Superior gastric group of nodes
- Supra-pyloric group of nodes
- Pancreaticocolienal group of nodes
- Inferior gastric sub-pyloric group
Histology
Types of Gastric Tumors

- **Benign**
  - Non neoplastic gastric polyps: Hyperplastic, Hamartomatous, Inflammatory, Heterotopic
  - Neoplastic polyps: adenoma
  - Leiomyoma, lipoma, neurofibroma,

- **Malignant**
  - Carcinoma
  - Lymphoma
  - Mesenchymal Tumors
  - Carcinoids
Histological Types of Gastric Carcinoma

- Adenocarcinoma - (95%)
  - Papillary adenocarcinoma
  - Tubular adenocarcinoma
  - Mucinous adenocarcinoma
  - Signet-ring cell carcinoma
- Adeno-squamous carcinoma
- Squamous cell carcinoma
- Small cell carcinoma
- Undifferentiated carcinoma (5%)
Epidemiology

- **Age**: peak incidence b/w 70-80 years
- **Gender**: Male : Female ratio 2:1
- **Geographic distribution**: very common in Japan, Chile, China, Finland, Australia
- Worldwide **decline in the incidence** of gastric cancer during the past 30 years
- In contrast **tumor of upper third of the stomach, including GE junction** has increased. (50-60%)
Site of Tumor

- 50-60%: Fundus
- 15-30%: Body (greater curvature)
- 20%: Duodenum

Diagram of the stomach with labeled sections.
Etiology

- Male, Blood group A
- Diet rich in nitrates, salts, pickled food
- Previous gastric resections
- Helicobacter pylori gastritis
- Atrophy gastritis & pernicious anemia
- Adenomatous polyps- (>2 cm have 25% incidence of malignancy)
- Familial polyposis syndrome.
- Smoking, alcohol consumption
Protective Factors

Fresh fruits, vegetables, carotene, vitamin C, and calcium are protective against ca stomach
Pathogenesis

- Diet Low in Vitamin C, E High-Salt Diet
  - Normal
  - Chronic Superficial Gastritis
  - Atrophic Gastritis
  - Intestinal Metaplasia
  - Dysplasia
  - Cancer

- H. pylori
Classification of gastric cancer

- Early gastric cancer
- Advanced gastric cancer
Early Gastric Cancer

- Limited to mucosa & sub mucosa with or without lymph node involvement
Advanced Gastric Ca

- Tumors involves the muscularis propria
Lauren or (DIO) Classification of gastric carcinoma

- Diffuse type
- Intestinal type
- Other
## Difference b/w Diffuse and Intestinal Type

<table>
<thead>
<tr>
<th>Features</th>
<th>Intestinal</th>
<th>Diffuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>elderly</td>
<td>young</td>
</tr>
<tr>
<td>Sex</td>
<td>male</td>
<td>Female</td>
</tr>
<tr>
<td>Histology</td>
<td>Intes metaplasia</td>
<td>Normal mucosa</td>
</tr>
<tr>
<td>Early cancer</td>
<td>Protruding</td>
<td>Flat, Depressed or excavated</td>
</tr>
<tr>
<td>Infiltration</td>
<td>Localized</td>
<td>Diffused</td>
</tr>
<tr>
<td>Peritoneal mets</td>
<td>Infrequent</td>
<td>Frequent</td>
</tr>
<tr>
<td>Hepatic mets</td>
<td>Nodular</td>
<td>Diffuse</td>
</tr>
</tbody>
</table>
## Difference b/w Diffuse and Intestinal Type

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<thead>
<tr>
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<th>Diffuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood group-A</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Pernicious Anemia</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Genetics</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>H-Pylori</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Prognosis</td>
<td>better</td>
<td>worse</td>
</tr>
</tbody>
</table>
Spread of Ca Stomach

- Direct spread - adjacent structures like pancreas, colon liver
- Lymphatic - permeation or embolization
- Blood borne - Liver, lungs and bones
- Trans peritoneal - ascites, umbilicus or ovaries
TNM Staging

**T: Primary tumor**

- **TO** No evidence of primary tumor
- **Tis** Carcinoma in situ;
- **T1** Tumor limited to mucosa and submucosa
- **T2** Tumor invades muscularis propria
- **T3** Tumor penetrates serosa without invasion of adjacent structures
- **T4** Tumor invades adjacent structures
TNM-Staging

N-Regional Lymph nodes
N0 No metastasis to regional lymph nodes
N1 Involvement of perigastric Lymph nodes within 3 cm of primary tumor
N2 Involvement of perigastric Lymph nodes more than 3 cm from tumor edge or involvement of left gastric, splenic, celiac or hepatic nodes

M-Distant metastasis
M0 No distant metastasis
M1 Distant metastasis, Involvement of lymph nodes beyond N2 is regarded as distant metastasis
Presentation

- Approx. 1/3 rd cases of ca stomach are metastatic at presentation.
- Presentation is vague during early stage.
- Epigastric abdominal pain, indigestion, anorexia, weight loss, nausea, vomiting, early satiety and fatigue.
- Dysphagia - proximal cancers.
- Gastric outlet obstruction - distal cancers.
- Perforation and bleeding (1-4%).
Signs suggesting advanced tumors

- Palpable epigastric mass.
- Enlarged supraclavicular nodes (Virchow’s node)-Trosier’s sign.
- Infiltration of umbilicus (Sister Mary Joseph node).
- Fullness in pelvic cul-de-sac (Blummer’s shelf).
- Enlarged ovaries on PV examination (Krukenburg’s tumor).
- Hepatosplenomegaly with ascites and jaundice.
Investigations

- Upper GI endoscopy with biopsy (method of choice)
- Upper GI contrast studies.
- CT scan abdomen and pelvis
- Endoscopic ultrasonography
- Laparoscopy

*Tumor markers are used to detect recurrence after surgical treatment. CEA, CA19-9, Ca 125, Ca72-4. The most reliable one is Ca 72-4.*
EGD

- Method of choice
- Direct visualization
- Biopsy of suspicious lesion
Endoscopic pictures of Carcinoma stomach
Endoscopic pictures of Carcinoma stomach
CT Scan Abdomen

- Exact size, location and local infiltration of tumor
- Best non invasive modality for detecting metastasis
- Malignant ascites
- Liver metastases
- Overall accuracy is 60-80 % for staging
Gastric tumor with lymphadenopathy & liver mets
CT abdomen -gastric tumor
Endoscopic Ultrasound

- Superior to CT in delineating the depth of tumor invasion in gastric wall and surrounding structure.
- Identifying the peri gastric lymphadenopathy.
- Most accurate method for T-stage staging.
- Accuracy for N staging approach to 70%.
- Addition of FNAC increases accuracy to 100%.
Laparoscopy

- Significantly enhance the accuracy of staging.
- It detect small volume peritoneal and liver lesions in 20-30% of patients believed to have loco-regional disease.
- Avoid unnecessary laparotomies.
- Not indicated in T1 and T2 lesions.
Management of Ca Stomach

- Treatment depends on the stage & location
  - **Early gastric cancer**; curative surgery
  - **Advanced cancer**; curative/palliative surgery
  - **Metastatic cancer**; palliative therapy (chemo-radiotherapy)
- Surgical intervention only to deal with complications; like perforation, obstruction, bleeding
Treatment options of early gastric cancers

- Gastrectomy with D1 lymphadenectomy is gold standard.
- Limited gastric resection-2 cm healthy margins.
- Endoscopic mucosal resection.
- Laparoscopic gastric resections.
Surgery for locally advanced gastric cancers

- Gastrectomy with D2 Lymphadenectomy is the standard operation.
- Total gastrectomy - for proximal lesion (cardia and fundus).
- Total gastrectomy - mid body tumor.
- Distal subtotal gastrectomy - distal tumor (antral/pyloric) - provided negative margins can be achieved - 5 cm margins
Proximal Gastric Tumor

- Total gastrectomy
- D2 Lymphadenectomy
- Roux- en- Y esophago- jejunostomy
- Tumor involving the GE junction requires esophago -gastrectomy
- Cervical or thoracic anastomosis
Total gastrectomy
Functional reconstruction after total gastrectomy
Mid body & distal Tumor

- **Mid body Tumors** requires total gastrectomy to achieve adequate margins-5cm
- **Distal tumors**, distal subtotal gastrectomy or total gastrectomy.
- Distal Subtotal gastrectomy is the superior option when adequate margins can be achieved
- Nutritional status and quality of life is better in subtotal distal gastrectomy
Distal Subtotal Gastrectomy
Distal Subtotal Gastrectomy
Adjuvant therapy

- All patients except T1-2 N0 M0 are at high risk for local or systemic recurrence following curative surgery - candidates of adjuvant therapy
- Improved overall and disease free survival after resection.
- 5-FU+doxorubicin or epirubicin + cisplatin
Neo adjuvant chemotherapy

It improves

- Patients tolerance,
- Resectability rate (down staging)
- Overall patients survival.
- Improves curative resection rates
Palliative therapy for metastatic disease

- The best results are obtained by palliative gastrectomy if patients condition permits.
- It prevents bleeding, obstruction and perforation.
- Gastrojejunostomy for antral lesions.
- Endoscopic palliation like intubation or stenting in proximal lesion.
- Palliative chemo-radiation-prolongs survival, improve patients symptoms and quality of life.
Early Complications after gastric surgery

- Leak from EJ anastomosis
- Duodenal stump Leak
- Para duodenal collections
- Generalized peritonitis
- Secondary Haemorrhage
Late complication following gastric surgery

- Nutritional disturbances - Vit B12, Vit D, iron, folate, calcium
- Dumping syndrome - early & late
- Alkaline reflux gastritis
- Roux stasis syndrome
- Loop syndrome - afferent & efferent
- Post vagotomy diarrhea
- Recurrence of tumor
Thanks