BY BITO HEALTH

GASTRIC CANCER

GASTRIC CANCER & SURGERY

This booklet is created to provide the necessary, easy-to-understand information about stomach cancer, empower patients on every step of the cancer journey, make choices, anticipate the side effects of treatment and lifestyle changes, and ensure that every patient has the best outcome.

STOMACH CANCER

In the USA, stomach cancer is relatively rare compared to other cancers. However, worldwide, stomach cancer is the 5th most common cancer. It is the 4th most common cancer in men and the 7th most common cancer in women.

WHERE IS THE STOMACH?

Both the esophagus and stomach are the upper part of the digestive system. The esophagus is located in the chest, and the stomach is in your abdomen. The esophagus is about 25 cm long and extends from the throat's bottom (hypopharynx) to the stomach. As the food reaches the end of the esophagus, it passes into the stomach through a muscular valve, the lower esophageal sphincter. This short section is also called the gastroesophageal junction (GEJ). The stomach receives food, contracts periodically, mixes acid and enzyme and churns the food down into almost liquid before it passes it to the first portion of the small intestine (called the duodenum) via a muscular valve called the pylorus.

What is stomach cancer?

The stomach has three layers of tissues. The inner layer is called the epithelium (or mucosa). For various reasons, significantly abnormal changes can occur, transforming the normal epithelial cell into a cancer cell. Like all cancer cells, stomach cancer can grow, spread, and must be treated.

What are the symptoms of stomach cancer?

Most patients with stomach cancer experience no symptoms, especially in the early stages of the disease.

When symptoms appear, they will likely vary depending on the size and location of cancer. These symptoms may include bleeding (vomiting blood or passing blood in the stool), anemia due to chronic blood loss, vague upper abdominal pain, feeling full quickly after small amounts of food, indigestion, nausea, vomiting, fatigue, or unintended weight loss.

DIAGNOSIS

How is stomach cancer diagnosed?

Often, the diagnosis of stomach cancer requires patients to undergo upper endoscopy (or esophagogastroduodenoscopy, EGD). During the procedure, patients will be sedated. A lighted endoscope is inserted through the mouth to examine the lining of the esophagus, stomach, and the first portion of the small intestine (called the duodenum). Here, the gastroenterologist will biopsy any area of suspicion. A pathologist will examine this biopsied tissue under a microscope before diagnosing it.

Diagnosis of stomach cancer

Most time, the pathology report will contain the following elements. In general, the intestinal subtype and the well and moderately differentiated stomach cancer are more likely to be chemotherapy-sensitive and less likely to be understage.

PREVIEW
bitohealth.org sample – not for resale

TYPE OF CANCER

- Stomach Cancer
- Gastroesophageal Junction cancer
- (Siewert Classification of Type 1, 2, and 3)

THE ESOPHAGUS CAN BE DIVIDED INTO THREE PARTS

- Proximal (Cervical)
- Mid (Thoracic)
- Distal (Abdominal)

THE STOMACH CAN BE DIVIDED INTO THREE PARTS

- Proximal (Cardia-fundus)
- Mid (Body)
- Distal (Antral-pylorus)

HISTOLOGIC TYPE: ADENOCARCINOMA LAUREN CLASSIFICATION OF ADENOCARCINOMA

- Intestinal type
- Diffuse type (includes signet-ring carcinoma, classified as greater than 50% signet-ring cells)
- Mixed (approximately equal amounts of intestinal and diffuse)
- Others

HISTOLOGIC GRADE

- Well differentiated
- Moderately differentiated
- Poorly differentiated

STAGING
What other tests do I need after the diagnosis is made?

Your doctor may arrange the following tests to "stage" cancer. Staging is a process to determine the extent of cancer and if it has spread. Knowing the stage of your cancer helps your care team understand the seriousness of cancer, plan for the best treatment and help predict the chances of survival.

CT scan (Computer Tomography) or MRI (Magnetic Resonance Imaging)

A radiological study that makes a series of images through the different body areas (chest, abdomen, and pelvic). Contrast may be injected into a vein in your arm or swallowed to help the internal tissue show up more clearly. (Picture Labelled: CT scan)

PET scan (Positron Emission Tomography)

A nuclear medicine study to find cancer cells in the body. A small amount of radiolabeled sugar is injected into a vein. The PET scanner shows where sugar is being used in the body. Cancer cells appear brighter in the picture because they are more active and take up more sugar than normal cells. A PET is useful to help determine the N-stage and M-stage. (Picture Labelled: PET scan)

EUS (Endoscopic Ultrasound)

A probe at the end of the endoscope sends sound waves off internal tissues to make echoes and then form pictures of body tissues. An additional biopsy can be taken from the suspicious area and any suspicious adjacent lymph nodes. EUS can help your doctor determine the local extent of the tumor (T-stage) and see whether surrounding lymph nodes are involved (N-stage). (Picture Labelled: Endoscopic ultrasound)

Staging Laparoscopy

This minimally invasive surgical procedure is performed under general anesthesia. A surgeon inserts a camera into the abdomen and examines the lining of the abdomen cavity (peritoneum), the surface of major intra-abdominal organs, to check for the spread of cancer.

PREVIEW
sample — not for resale
bitohealth.org

PREVIEW
Sample — not for resale
bitohealth.org

Stomach cancer TNM staging AJCC UICC 8th edition

Primary tumor	
T category	T criteria
TX	Primary tumor cannot be assessed
TO	No evidence of primary tumor
Tis	Carcinoma in site: Intraepithelial tumor without invasion of the lamina propria, high-grade dysplasia
T1	Tumor invades the lamina propria, muscularis mucosae, or submucosa
T1a	Tumor invades the lamina propria or muscularis mucosae
T1b	Tumor invades the submucosa
T2	Tumor invades the muscularis propria*
T3	Tumor penetrates subsercosal connective tissue without invasion of the visceral peritoneum or adjascent structures ¶△
T4	Tumor invades the serosa (visceral peritoneum) or adjascent structures ¶△
T4a	Tumor invades the serosa (visceral peritoneum)
T4b	Tumor invades adjascent structures/organs

* A tumor may penetrate the muscularis propria with extension into the gastrocollic or gastro hepatic ligaments, or into the greater or lesser omentum, without peroration of the visceral peritoneum covering these structures. in this case, the tumor is classified as T3.
If there is perforation of the visceral peritoneum covering the gastric ligaments or the omentum, the tumor should be classified as T4.

¶ The adjacent structures of the stomach inculde the spleen, transverse colon, liver, diaphragm, pancreass, abdominal wall, adrenal gland, kidney, small intestine and retroperitoneum.

△ Intramural extension to the duodenum or esophagus is not considered invasion of an adjacent structure, but is classified using the depth of the greatest invasion in any of these sites.

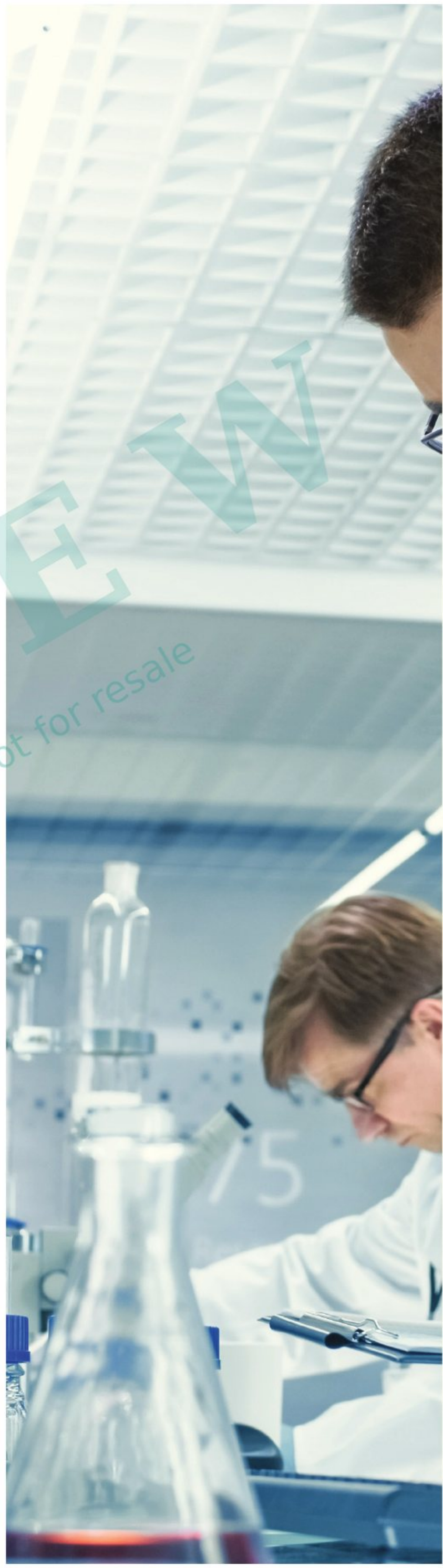
Regional lymph nodes (N)	
N category	N criteria
NX	Regional lymph node(s) cannot be assessed
NO	No regional lymh node metastasis
N1	Metastases in 1 or 2 regional lymph nodes
N2	Metastases in 3 to 6 regional lymph nodes
N3	Metastases in 7 or more regional lymph nodes
N3a	Metastases in 7 to 15 regional lymph nodes
N3b	Metastases in 16 or more regional lymph nodes
Distant metastasis (M)	
M category	M criteria
MO	No distant metastasis
M1	Distant metastasis

Prognostic stage groups

Clinical (cTNM)			
When T is...	And N is...	And M is...	Then the stage group is ...
Tis	NO	MO	0
T1	NO	MO	I
T2	NO	MO	I
T1	N1, N2 or N3	MO	IIA
T2	N1, N2 or N3	MO	IIA
T3	NO	MO	IIB
T4a	NO	MO	IIB
T3	N1, N2 or N3	MO	III
T4a	N1, N2 or N3	MO	III
T4b	Any N	MO	IVA
Any T	Any N	M1	IVB

PREVIEW sample bitohealth.com

STOMACH CANCER: GENETIC AND SPECIFIC TESTING



FAMILIAL GASTRIC CANCER

Most gastric cancers are not inherited.

Several genetic mutations increase a person's risk of developing gastric cancer. The most common one is the CDH1 (E-cadherin) gene mutation. Genetic testing for this gene mutation is not routinely done for all patients. Several criteria need to be met, and individuals need to be assessed by a genetic counselor. If indicated, the genetic counselor will do genetic testing. A multidisciplinary team with special interests in this condition best manages individuals who tested positive for this gene mutation. The individual will need upper endoscopy with multiple gastric biopsies (Cambridge or Bethesda protocols). Subspecialized gastrointestinal pathologists best review the biopsied tissues. In the presence of malignancy, management will follow the pathway of gastric cancer. In the absence of malignancy, prophylactic total gastrectomy is recommended. However, some individuals may opt for ongoing endoscopic surveillance. The following pathway is recommended by "Hereditary diffuse gastric cancer: updated clinical practice guidelines." Lancet Oncol 2020;21(8):e386-e397.

NON-FAMILIAL GASTRIC CANCER

Most gastric cancers belong to this non-familial gastric cancer category. The actual cause of why an individual develops stomach cancer is unknown. Yet, a non-inherited genetic mutation or specific protein expression can sometimes occur at the tissue level. The presence of specific genetic mutations or specific protein expression can guide treatment, and they may carry prognostic significance.

MISMATCH REPAIR GENE (MMR)

Mismatch repair (MMR) genes create a mechanism for identifying and repairing mistakes during DNA replication. If the MMR genes become mutated, they will not work correctly. Mistakes made during DNA replication will not be repaired. This leaves the cell vulnerable and unhealthy.

If there is no mutation to the MMR gene testing, the tumor is classified as proficient MMR (pMMR). If there is a mutation in the MMR gene testing, the tumor is classified as a deficient MMR (dMMR) tumor.

THE PROGRAMMED DEATH RECEPTOR LIGAND 1 (PD-L1)

PD-L1 is a unique protein that acts as a "brake" to control the body's immune responses. This protein may be found on some normal cells and in higher-than-normal amounts on some cancer cells. When PD-L1 binds to another protein called PD-1 (a protein found on T cells), it keeps T cells from killing the PD-L1-containing cells, including the cancer cells. Specific immunotherapy called immune checkpoint inhibitors to bind to PD-L1 and block its binding to PD-1. This releases the "brakes" on the immune system and leaves T cells free to kill cancer cells.

PREVIEW sample — not for resale bitohealth.org