Gastric Cancer Staging AJCC eighth edition

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Summary of changes

- New clinical stage prognostic groups, cTNM
- Postneoadjuvant therapy pathologic stage groupings, ypTNM - new prognostic information
- Change to anatomic boundary for staging carcinoma at oesophagogastric junction
- Changes to pathologic stage grouping
- Subclassification of N3

- This staging does not apply to GIST or other sarcomas, lymphoma, or well differentiated neuroendocrine tumours
- Mixed adenoneuroendocrine carcinoma and poorly differentiated neuroendocrine carcinoma are staged by this system

Tumours to stage by gastric carcinoma system

- A tumour with epicentre more than 2cm from the oesophagogastric junction or;
- A tumour centred within 2cm of the oesophagogastric junction but not crossing it
- Therefore if centred within proximal 2cm of stomach and crossing OGJ, stage by the oesophageal staging system

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Clinical staging

- Application of pathologic stage groupings to clinical staging has not been validated and may not be appropriate
- New prognostic stage groupings
  - Separate data set of surgically treated and non-surgically treated patients (USA & Japan, 4091 pts)

Clinical staging investigations

- **Endoscopic ultrasound (EUS)**
- CT
- Laparoscopy +/- biopsy and washings cytology
- MRI
- PET-CT

EUS


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Sex: Age:
24/08/2017
17:04:32
CVP:2
D.F:1
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1


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3

4


1:RADIAL
Probe:OLY-RSR1

5


1:RADIAL
Probe:OLY-RSR1

6

Clinical staging

- Lymph nodes – round, circumscribed echogenic structures >10mm on EUS considered positive node
- FNA confirmation of mets via EUS encouraged
- EUS may see some liver mets
- On CT lymph nodes which are round &/or >10mm in short axis diameter are suspicious
- PET/CT limited due to false negative rate

Diagnostic laparoscopy

- For cT3 or greater
- If clinically suspicious nodes without distant mets on imaging
- Visible peritoneal mets – biopsy
- Washings should be done
- Positive washing cytology = pM1, incorporated into clinical stage; cTcNpM1

Clinical Prognostic Stage Groups (cTNM)

When T is…	And N is…	And M is…	Then the stage group is…
Tis	N0	M0	0
T1	N0	M0	I
T2	N0	M0	I
T1	N1, N2, or N3	M0	IIA
T2	N1, N2, or N3	M0	IIA
T3	N0	M0	IIB
T4a	N0	M0	IIB
T3	N1, N2, or N3	M0	III
T4a	N1, N2, or N3	M0	III
T4b	Any N	M0	IVA
Any T	Any N	M1	IVB

- Different to pathologic stage groups
- Simplified nodes – involved or not
- cT4b NX M0 has poor prognosis, hence is stage IV

Pathologic Staging

- Based on more than 25000 gastric adenocarcinoma patients, Asian and western, treated by surgery, min. 5yrs follow up

Changes to TNM definitions

- pN3 ->
  - pN3a metastases in 7 to 15 regional lymph nodes
  - pN3b metastases in 16 or more regional lymph nodes
- However this was the case in the 7th edition

Definitions – primary tumour

- TX Primary tumour cannot be assessed
- T0 No evidence of primary tumour
- Tis Carcinoma in situ
- T1a Tumour invades lamina propria or muscularis mucosae
- T1b Tumour invades submucosa
- T2 Tumour invades muscularis propria
- T3 Tumour penetrates subserosal tissue without invasion of visceral peritoneum or adjacent structures
- T4a Tumour penetrates serosa (visceral peritoneum)
- T4b Tumour directly invades adjacent organs or structures

Pathologic staging – primary tumour

- Invasion of greater or lesser omentum, gastrocolic or gastrohepatic ligaments without breach of peritoneum is T3
- Breach of peritoneum = T4
- Intramural extension along alimentary canal into oesophagus or duodenum is not invasion of adjacent organ (ie. Not T4b)

Definitions – Lymph nodes

- NX Regional lymph nodes(s) cannot be assessed
- N0 No regional lymph node metastases
- N1 Metastases in 1-2 regional lymph nodes
- N2 Metastases in 3-6 regional lymph nodes
- N3a Metastases in 7-15 regional lymph nodes
- N3b Metastasis in 16 or more regional lymph nodes

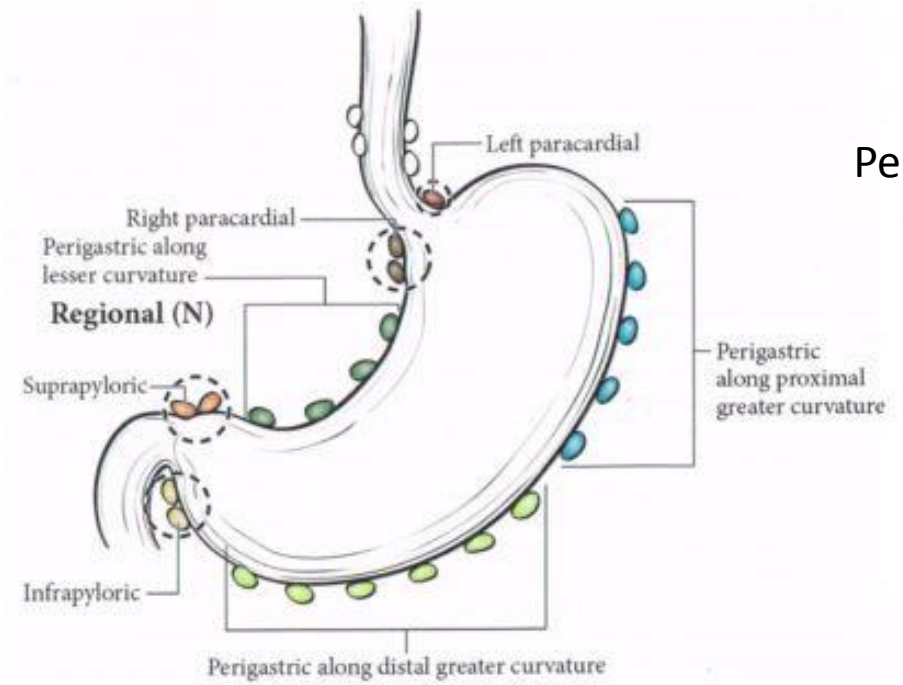
Pathologic staging - Lymph nodes

- At least 16 nodes, 30 or more desirable
- Metastatic carcinoma deposits in subserosal fat with no residual node and no vascular or neural structure are regarded as lymph node deposits

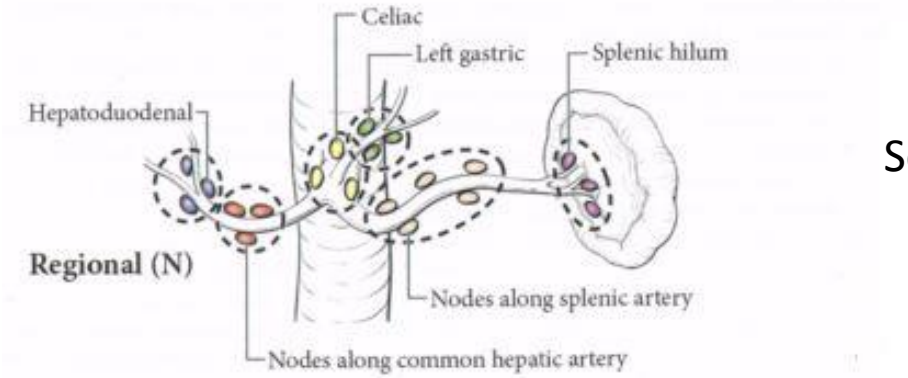
Regional lymph node groups

- Perigastric along greater curvature
- Perigastric along lesser curvature
- Right and left paracardial (cardio-oesophageal)
- Suprapyloric
- Infrapyloric
- Left gastric artery
- Celiac artery
- Common hepatic artery
- Hepatoduodenal (along proper hepatic artery, including portal)
- Splenic artery
- Splenic hilum

Diagram of lymph node groups



Perigastric lymph nodes



Second tier nodes

Non-regional (distant) lymph nodes

- Retropancreatic, pancreaticoduodenal, peripancreatic, superior mesenteric, middle colic, para-aortic, retroperitoneal, others

Japanese Gastric Cancer Association 2011

PMC full text: Transl Gastroenterol Hepatol. 2017; 2: 2.
Published online 2017 Jan 17. doi: 10.21037/tgh.2016.12.03

Table 2

Anatomical definitions of LN stations

Station nr	Definition
1	Right paracardial LNs, including those along the first branch of the ascending limb of the left gastric artery
2	Left paracardial LNs including those along the esophagocardiac branch of the left subphrenic artery
3a	Lesser curvature LNs along the branches of the left gastric artery
3b	Lesser curvature LNs along the 2nd branch and distal part of the right gastric artery
4sa	Left greater curvature LNs along the short gastric arteries (perigastric area)
4sb	Left greater curvature LNs along the left gastroepiploic artery (perigastric area)
4d	Rt. greater curvature LNs along the 2nd branch and distal part of the right gastroepiploic artery
5	Suprapyloric LNs along the 1st branch and proximal part of the right gastric artery
6	Infrapyloric LNs along the first branch and proximal part of the right gastroepiploic artery down to the confluence of the right gastroepiploic vein and the anterior superior pancreatoduodenal vein
7	LNs along the trunk of left gastric artery between its root and the origin of its ascending branch
8a	Anterosuperior LNs along the common hepatic artery
8p	Posterior LNs along the common hepatic artery
9	Coeliac artery
10	Splenic hilar LNs including those adjacent to the splenic artery distal to the pancreatic tail, and those on the roots of the short gastric arteries and those along the left gastroepiploic artery proximal to its 1st gastric branch
11p	Proximal splenic artery LNs from its origin to halfway between its origin and the pancreatic tail end
11d	Distal splenic artery LNs from halfway between its origin and the pancreatic tail end to the end of the pancreatic tail
12a	Hepatoduodenal ligament LNs along the proper hepatic artery, in the caudal half between the confluence of the right and left hepatic ducts and the upper border of the pancreas

12b	Hepatoduodenal ligament LNs along the bile duct, in the caudal half between the confluence of the right and left hepatic ducts and the upper border of the pancreas
12p	Hepatoduodenal ligament LNs along the portal vein in the caudal half between the confluence of the right and left hepatic ducts and the upper border of the pancreas
13	LNs on the posterior surface of the pancreatic head cranial to the duodenal papilla
14v	LNs along the superior mesenteric vein
15	LNs along the middle colic vessels
16a1	Paraaortic LNs in the diaphragmatic aortic hiatus
16a2	Paraaortic LNs between the upper margin of the origin of the celiac artery and the lower border of the left renal vein
16b1	Paraaortic LNs between the lower border of the left renal vein and the upper border of the origin of the inferior mesenteric artery
16b2	Paraaortic LNs between the upper border of the origin of the inferior mesenteric artery and the aortic bifurcation
17	LNs on the anterior surface of the pancreatic head beneath the pancreatic sheath
18	LNs along the inferior border of the pancreatic body
19	Infradiaphragmatic LNs predominantly along the subphrenic artery
20	Paraesophageal LNs in the diaphragmatic esophageal hiatus
110	Paraesophageal LNs in the lower thorax
111	Supradiaphragmatic LNs separate from the esophagus
112	Posterior mediastinal LNs separate from the esophagus and the esophageal hiatus

LNs, lymph nodes. Adapted from Japanese classification of gastric carcinoma: 3rd English edition, Gastric Cancer (2011) 14: 101-112, with permission.

Definitions – Distant metastases

- M0 No distant metastasis
- M1 Distant metastasis

Distant metastases

- Liver
- Peritoneum
- Non-regional lymph nodes
- Lung, CNS – less common
- Direct extension into liver, colon, pancreas, diaphragm = T4b, not M1
- Positive peritoneal cytology = M1
- May incorporate clinical M stage into pathologic

Changes to pathologic stage groups

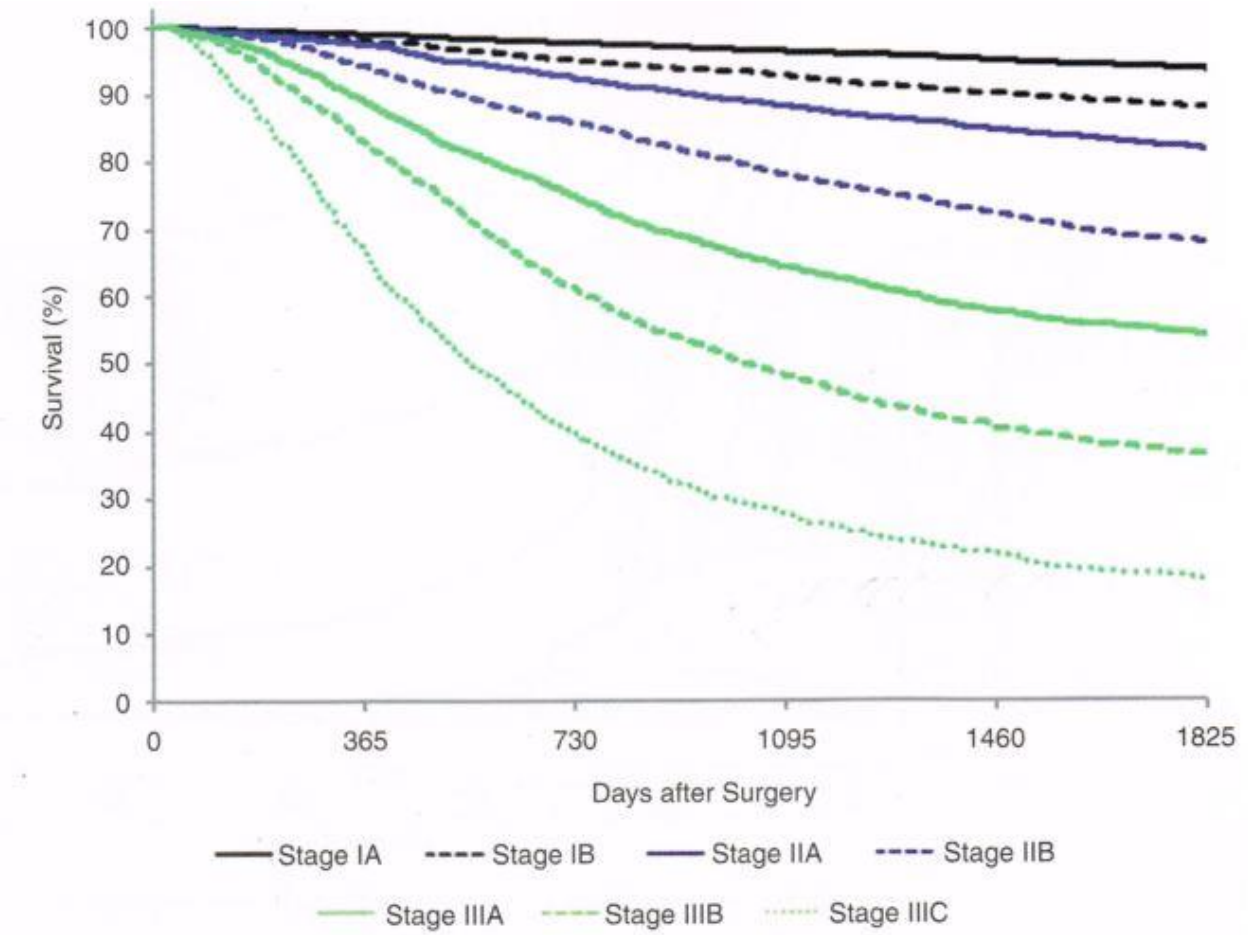
- pT4aN2 and pT4bN0 are now Stage IIIA (previously IIIB)

Pathologic Prognostic Stage Groups (pTNM)

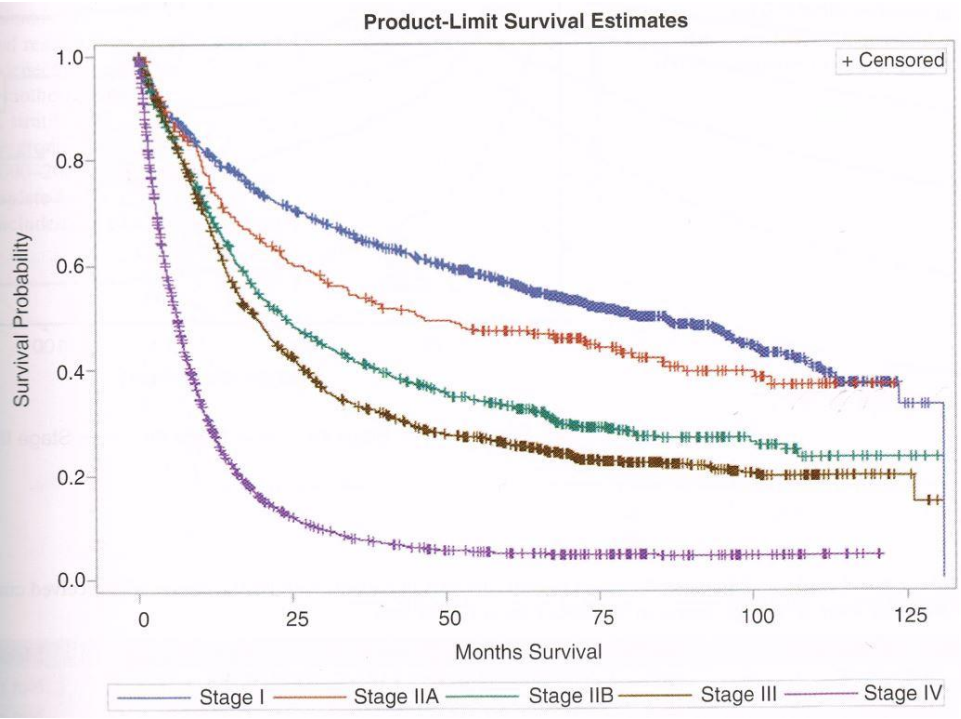
When T is…	And N is…	And M is…	Then the stage group is…
Tis	N0	M0	0
T1	N0	M0	IA
T1	N1	M0	IB
T2	N0	M0	IB
T1	N2	M0	IIA
T2	N1	M0	IIA
T3	N0	M0	IIA
T1	N3a	M0	IIB
T2	N2	M0	IIB
T3	N1	M0	IIB
T4a	N0	M0	IIB
T2	N3a	M0	IIIA
T3	N2	M0	IIIA
T4a	N1	M0	IIIA
T4a	N2	M0	IIIA
T4b	N0	M0	IIIA
T1	N3b	M0	IIIB
T2	N3b	M0	IIIB

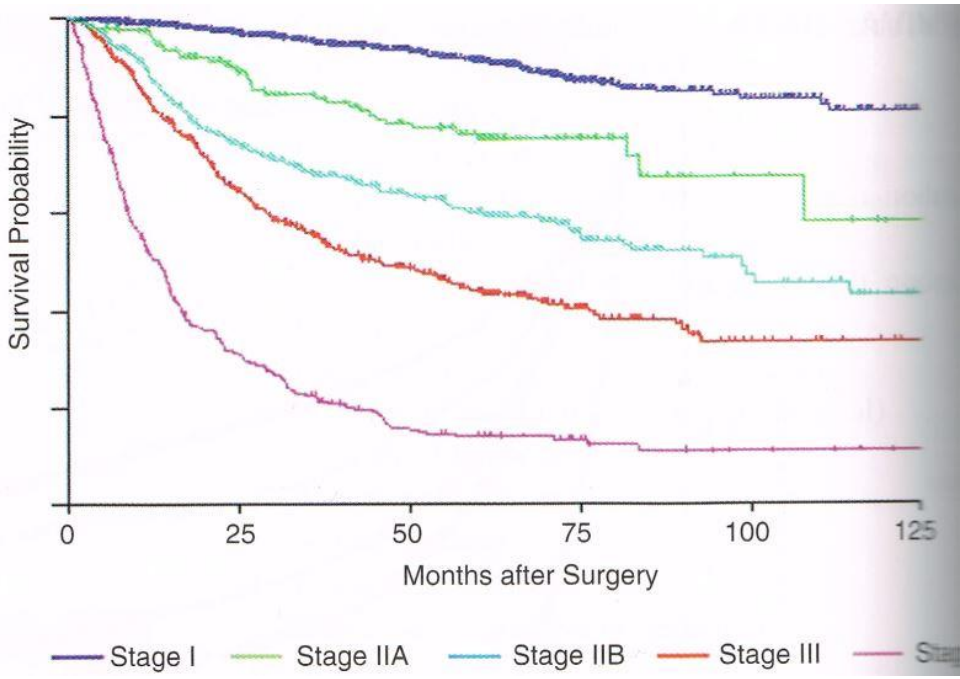
When T is…	And N is…	And M is…	Then the stage group is…
T3	N3a	M0	IIIB
T4a	N3a	M0	IIIB
T4b	N1	M0	IIIB
T4b	N2	M0	IIIB
T3	N3b	M0	IIIC
T4a	N3b	M0	IIIC
T4b	N3a	M0	IIIC
T4b	N3b	M0	IIIC
Any T	Any N	M1	IV

Survival by pathologic stage groups



Survival by clinical stage (cTNM)





USA (surgery and no surgery)

Japan (surgically treated)

Post-neoadjuvant therapy stage groupings

- New prognostic groupings for ypTNM
- Separate data set, approx. 700 patients

Post-Neoadjuvant therapy classification

- Acellular mucin is not regarded as residual tumour
- ypT based on deepest level of residual carcinoma cells
- Positive lymph nodes must have some residual carcinoma cells

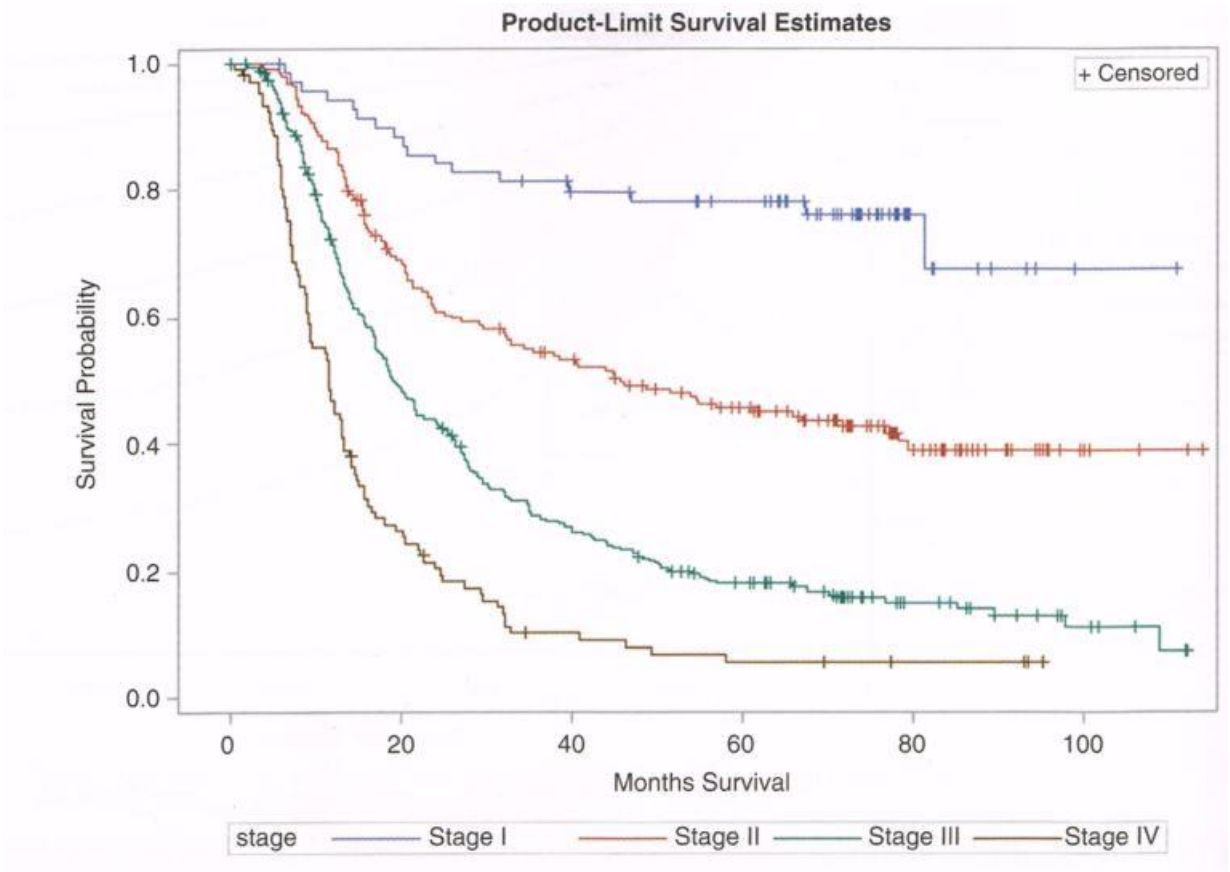
Tumour regression

- Combined gross and microscopic assessment
- Tumour regression may be expressed as percentage loss of tumour cells in the tumour bed (area of fibrosis +/- inflammation), ie. 100% treatment response = fibrosis with no carcinoma
- Residual carcinoma cells = incomplete response

Post neoadjuvant Therapy Prognostic Stage Groups

When T is…	And N is…	And M is…	Then the stage group is…
T1	N0	M0	I
T2	N0	M0	I
T1	N1	M0	I
T3	N0	M0	II
T2	N1	M0	II
T1	N2	M0	II
T4a	N0	M0	II
T3	N1	M0	II
T2	N2	M0	II
T1	N3	M0	II
T4a	N1	M0	III
T3	N2	M0	III
T2	N3	M0	III
T4b	N0	M0	III
T4b	N1	M0	III
T4a	N2	M0	III
T3	N3	M0	III
T4b	N2	M0	III
T4b	N3	M0	III
T4a	N3	M0	III
Any T	Any N	M1	IV

Survival of patients treated by neoadjuvant chemoradiation and surgery by yp stage groups



Other recommended prognostic factors

- Serum CEA and CA19-9 levels for monitoring in surveillance period after baseline levels
- HER2 for consideration of HER2 therapy
- MSI – better prognosis for MSI-H but prognostic value not established

Carcinoma grade

- GX Grade cannot be assessed
- G1 Well differentiated
- G2 Moderately differentiated
- G3 Poorly differentiated

Carcinoma classification

- According to WHO classification 2010

Gastric Neuroendocrine Tumours - changes

- Prognostic stage groups have been condensed; no more substages
- Additional factor for clinical care is recommendation for measurement of serum gastrin levels – aid in classifying the neuroendocrine tumour (type 1 and 2 with elevated gastrin levels, type 3 normal)
- Pancreatostatin an emerging prognostic factor for clinical care

Definitions of primary tumour (T)

- TX Primary tumour cannot be assessed
- T0 No evidence of primary tumour
- T1 Tumour invades lamina propria or submucosa and less than or equal to 1cm in size
- T2 Tumour invades muscularis propria or greater than 1cm in size
- T3 Tumour invades into subserosal tissue without penetration of visceral peritoneum
- T4 Tumour penetrates serosa (visceral peritoneum) or invades adjacent organs or structures

Definitions of regional lymph nodes

- NX Regional lymph nodes cannot be assessed
- N0 No regional lymph node metastasis
- N1 Regional lymph node metastasis

Definition of distant metastases

- M0 No distant metastases
- M1a Metastasis confined to the liver
- M1b Metastasis to at least 1 extrahepatic site (eg. Lung, ovary, non-regional lymph node, peritoneum, bone)
- M1c Both hepatic and extrahepatic metastases

Gastric neuroendocrine tumour pathologic stage groups

When T is…	And N is…	And M is…	Then the stage group is…
T1	N0	M0	I
T1	N1	M0	III
T1	N0, N1	M1	IV
T2	N0	M0	II
T2	N1	M0	III
T2	N0, N1	M1	IV
T3	N0	M0	II
T3	N1	M0	III
T3	N0, N1	M1	IV
T4	N0	M0	III
T4	N1	M0	III
T4	N0, N1	M1	IV

Some options are left out: T0 TX and NX combined with M1 = stage IV
Online errata spreadsheet