Table 1: Lymph-Nodal Station Boundary's description

(NOTES: Indications are stated per single nodal stations; Indications are drawn for supine position of the patients; Left and Right border refer to the L/R of the patients on the CT Scan (in supine position); Due to drawing by expansion from vessels, some nodal areas may overlap each other; LN 15: delineation is on purpose not addressed)

LN 1	LN 2	LN 3	LN 4	LN 5
LN 6	LN 7	LN 8	LN 9	LN 10
LN 11p+11d	LN 12	LN 13	LN 14	LN 16a1
LN 16a2	LN 16b1	LN 16b2	LN 17	LN 18
LN 19	LN 20	LN 110	LN 111	LN 112

Abbreviations: LN =Lymph-Nodal Station; GEJ=Gastro-Esophageal Junction

LN 1	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	Superior border of Diaphragmatic Esophageal Hiatus	It is at level defined by whichever the following has the most cranial location: Ascending branch of left gastric artery OR Bifurcation of left gastric artery into branches	- Liver OR - Vertical branch of left gastric artery OR - Soft tissue behind the "reflection" of left gastric artery	- Gastric Wall OR - Anterior border of diaphragm pillars	- Liver OR - Fatty tissue up to a maximum of 30 mm from gastric wall	Gastric Wall

Lymph-Nodal Station Description: LN 1- Right paracardial nodes

Specific Notes:

- It is useful to find where left gastric artery bends to give branches to lesser curvature: that is inferior AND anterior limit for LN1;

- This LN is also superiorly placed respect to LN 7

LN 2 Top	Upper Border Superior border of Diaphragmatic Hiatus	Inferior Border Level where GEJ it is no longer present in the Diaphragmatic Hiatus	Anterior Border Gastric Wall	Posterior Border Anterior border of diaphragm pillars	Right Lateral Border - Border of diaphragm pillars OR - Gastric/GEJ Wall	Left Lateral Border Gastric Wall bend

Lymph-Nodal Station Description: LN 2 - Left paracardial nodes

Specific Notes:

- A volume uncovered by delineation may remain between LN 2 and 4

LN 3 (a+b) Top	Upper Border First cranial level presenting fatty tissue and vessels in front of the lesser gastric curvature AND Ascending branches from left gastric artery	Inferior Border At the level of the gastroduodenal artery origin	Anterior Border Follows the border of lesser curvature vessels	Posterior Border Follows the border of lesser curvature vessels	Right Lateral Border - Follows the border of lesser curvature vessels OR - Liver	Left Lateral Border Gastric Wall

Lymph-Nodal Station Description: LN 3 (a+b) - nodes along the lesser curvature

Specific Notes:

- “3a” and “3b” are delineated together

- Overall, the “3a” and “3b”, looks like a “tube”-shape over the gastric wall

- Always in contact to gastric wall plus 10 to 20 mm (by clinician’s discretion) all around the vessels (circumferentially)

LN 4 Top	Upper Border - First cranial level presenting fatty tissue and vessels in front of the greater gastric curvature OR - First cranial level presenting fatty tissue and vessels corresponding to the gastric distal 1/3	Inferior Border Limit pylorus/duodenum	Anterior Border Approximate 5 mm margin from visible vessels	Posterior Border Approximate 5 mm margin from visible vessels	Right Lateral Border Gastric Wall	Left Lateral Border Fat tissue including visible vessels up to a maximum of 30 mm from gastric wall

Lymph-Nodal Station Description: LN 4sa - nodes along the short gastric vessels; LN 4sb - nodes along the left gastroepiploic vessels; LN 4d - nodes along the right gastroepiploic vessels

Specific Notes:

- Anyway it is difficult to give firm boundary between 4d and 4sa/4sb

- Anyway it is difficult to give firm boundary between stations 4d and 6 because of:

    - Oblique vessel path

    - Difficult CT recognition of pylorus

    - Difficult CT recognition of the *epiploon*

    - Includes "*vasa breviora*" (short vessels)

Recommendations:

- Follow vessels starting from right gastroepiploic and to the left gastroepiploic, that will be variable by individual anatomy and gastric distension

- Overall, the 4d and 4sb, look like a "tube"-shape over the gastric wall

- Always in contact to gastric wall plus 10 to 20 mm (by clinician's discretion) all around the vessels (circumferentially)

LN 5	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	Gastroduodenal Artery (origin)	Slice(/level) where the gastroduodenal artery is completely surrounded by duodenum / pylorus and pancreas	Pylorus/ medial duodenum wall	10 mm around vessels	10 mm around vessels	- 10 mm around vessels OR - Pancreas

Lymph-Nodal Station Description: LN 5 **-** Suprapyloric nodes

Specific Notes:

- It is in cranio-caudal continuity with LN 3

- Anyway it is difficult to give firm boundary between stations 3 and 5 because of:

    - Oblique vessel path

    - Difficult CT recognition of pylorus

    - Difficult CT recognition of *epiploon*

LN 6	Upper (Posterior) Border	Inferior (Distal) Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	Bifurcation of Gastroduodenal Artery into Superior Pancreaticoduodenal and Right gastroepiploic Upper (Anterior) Edge between Pylorus and Duodenum	First branches of epiploic vessels	8 mm (6-10mm) margin around fatty tissue and vessels	Pancreas and Pylorus	Pylorus and duodena wall	Pancreas + Stomach

Lymph-Nodal Station Description: LN 6 - Infrapyloric nodes

Specific Notes:

- It is in cranio-caudal continuity with LN 4

-The upper border level is the same of LN 17 but the other boundaries are specific to LN 6

- For delineation identify on multiple planar reconstruction the origin of gastroduodenal art. and 1st branch of gastroepiploic artery

- Anyway it is difficult to give firm boundary between stations 4d and 6 because of:

    - Oblique vessel path

    - Difficult CT recognition of pylorus

    - Difficult CT recognition of *epiploon*

LN 7	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	- First division in branches of left gastric artery	- 5 mm cranially to the superior border of celiac trunk / branches origin (i.e.: Superior border of LN 9)	- 10 mm fatty tissue anteriorly to left gastric artery OR - Pancreas	- 10 mm fatty tissue posteriorly to left gastric artery OR - Main celiac trunk/Branches borders	- 10 mm fatty tissue laterally to left gastric artery OR -Caudate lobe	- 10 mm fatty tissue laterally to left gastric artery OR - Stomach wall OR - Pancreas

Lymph-Nodal Station Description: LN 7 - nodes along the left gastric artery

Specific Notes:

-LN 7 includes 10 mm fatty tissue around the area between the root of left gastric artery and the origin of its ascending branches

LN 8 (a+p) Top	Upper Border 10 mm over the common hepatic artery	Inferior Border 10 mm under the common hepatic artery	Anterior Border - Fatty tissue around hepatic artery (max 10 mm) OR - Pancreas	Posterior Border - Fatty tissue around hepatic artery (max 10 mm) OR - Confluence of common hepatic artery to celiac axis	Right Lateral Border - Portal vein+ Proper hepatic artery OR - Liver OR - Fatty tissue around hepatic artery (max 10 mm)	Left Lateral Border - Fatty tissue around hepatic artery (max 10 mm) OR - Pancreas OR - Splenic artery convergence

Lymph-Nodal Station Description: LN 8a - nodes along the common hepatic artery (Anterosuperior group); LN 8p - nodes along the common hepatic artery (Posterior group)

Specific Notes:

- LN 8a + LN 8p are delineated as a single structure

- Follows hepatic artery anteriorly from celiac trunk until first bifurcation with 10 mm of radial margin

- Pancreas and other structures are not included

LN 9	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	- 5 mm cranially to the Superior border of celiac trunk OR - Convergence of splenic to hepatic artery (apply the most cranial one)	Superior border of superior mesenteric artery	- Delineation follows celiac trunk until the plane at it divides in branches OR - 5 mm from splenic vein posterior border OR - 8-10 mm from pancreatic border	5 millimeters anteriorly to the anterior border of aorta	- 15 mm from celiac axis border OR - Adrenal Gland	- 15 mm from celiac axis border OR - Up to the caudate lobe OR - Adrenal Gland

Lymph-Nodal Station Description: LN 9 - nodes around the celiac artery

LN 10	Upper (/Cranial) Border	Inferior (/Caudal) Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	Delineated 10 mm above splenic vessels (avoiding pancreas or other structures)	Delineated 10 mm below splenic vessels (avoiding pancreas or other structures)	Delineated 10 mm around splenic vessels (avoiding pancreas or other structures)	Delineated 10 mm around splenic vessels (avoiding pancreas or other structures)	- End of pancreatic tail OR - First branch division of splenic vessels	Splenic hilar surface

Lymph-Nodal Station Description: LN 10 - nodes at the splenic hilum

Specific Notes:

- Delineated 10 mm around splenic vessels

- Check right lateral boundaries by multiplanar reconstruction

LN	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
11p +11d Top	10 mm over the upper border of the splenic artery	- 10 mm under the inferior border of the splenic artery OR - Stop at the cranial border of splenic vein	Pancreas body/tail (avoiding pancreatic tissue)	10 mm posteriorly to posterior border of splenic artery	Sagittal plane of celiac bifurcation	End of Pancreatic tail

Lymph-Nodal Station Description: LN 11p - nodes along the proximal splenic artery; 11d - nodes along the distal splenic artery

Specific Notes:

- LN 11p + LN 11d are delineated together: if only one is needed, cut at the anatomical boundary from its origin to halfway between its origin and the pancreatic tail end (checking limit by multiplanar reconstruction)

- Delineated around splenic artery including fatty tissue within 10 mm

- Exclude pancreatic tissue or other structures

LN 12(a+b+p) Top	Upper Border - Confluence of bile duct	Inferior Border Full connection between Portal vein and Pancreas head	Anterior Border - Confluence of bile duct OR - 10 mm around artery or bile duct OR - Duodenal wall	Posterior Border - Anterior border of Inferior Vena Cava, always including portal vein OR - Hepatic lobe border	Right Lateral Border - Gastroduodenal Artery OR Right lateral border of Portal Vein	Left Lateral Border - Bifurcation Portal vein OR - Left lateral border of bile duct [upper levels] OR - 10 mm around bile duct [lower levels]

Lymph-Nodal Station Description: LN 12a - nodes in the hepatoduodenal ligament (along the hepatic artery); LN 12b - nodes in the hepatoduodenal ligament (along the bile duct); LN 12p - nodes in the hepatoduodenal ligament (behind the portal vein)

Specific Notes:

- No differences among the three levels of LN 12 (i.e.: a, b, p)

- No overlapping

LN 13	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	Starts at the upper limit of the pancreatic head	Upper limit of the duodenal D2-D3 junction	Posterior border of Pancreatic head	Anterior Border of Inferior Vena Cava	Edge of pancreatic head on the slice toward the duodenal wall	Edge of pancreatic head on the slice (never crossing the right border of superior mesenteric artery

Lymph-Nodal Station Description: LN 13 - nodes on the posterior surface of the pancreatic head

Specific Notes:

-Coronal views are important for the definition of the lower limit of the pancreatic uncinate process

LN 14	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	Superior mesenteric artery outlet (/superior border)	30 mm from SMA origin	- 10 mm around the vein and artery	- 10 mm around the vein and artery	- 10 mm around the vein and artery	- 10 mm around the vein and artery

Lymph-Nodal Station Description: LN 14v - nodes along the superior mesenteric vein; LN 14a - nodes along the superior mesenteric artery

Specific Notes:

- 10 mm around the vein vessel, including artery

LN 16a1 Top	Upper Border Diaphragm AORTIC Hiatus (at level of diaphragm pillars separation)	Inferior Border Upper margin of the origin of the celiac artery	Anterior Border Posterior border of diaphragm pillars (bilaterally)	Posterior Border Anterior border of vertebral bone	Right Lateral Border Posterior border of diaphragm pillars	Left Lateral Border Posterior border of diaphragm pillars

Lymph-Nodal Station Description: LN 16a1 - nodes in the aortic hiatus

Specific Notes:

- Placed posterior and parallel to “LN 19”

LN 16a2	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	Upper margin of the origin of the celiac artery	Lower margin left renal vein	10 mm ahead of aortic wall	Aortic wall plus the area in front of the anterior border of the right pillar and to a plane tangential to the anterior border of the left renal artery	10 mm margin from anterior aortic wall corresponding to its abdominal surface plus the area in front of the anterior border of right pillar	10 mm margin from anterior aortic wall corresponding to its abdominal surface not covered by pillars Anyway not going posteriorly to a plane tangential to the anterior border of the left renal artery

Lymph-Nodal Station Description: LN 16a2 - nodes around the abdominal aorta (from the upper margin of the celiac trunk to the lower margin of the left renal vein)

Specific Notes:

This nodal area may overlap with the surrounding ones

LN 16b1	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	Lower margin left renal vein	Upper margin of inferior mesenteric artery	10 mm ahead of aortic wall	Aortic wall	5 mm anterior of aortic wall in a semicircular direction (until half aorta; “hour 9 o’clock”)	5 mm ahead of aortic wall in a semicircular direction (until half aorta; “hour 3 o’clock”)

Lymph-Nodal Station Description: LN 16b1 - nodes around the abdominal aorta (from the lower margin of the left renal vein to the upper margin of the inferior mesenteric artery)

Specific Notes:

This nodal area may overlap with the surrounding ones

LN 16b2	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	Upper margin of inferior mesenteric artery	Aortic Bifurcation	5 mm ahead of aortic wall	Aortic wall	5 mm ahead of aortic wall in a semicircular direction (until half aorta; “hour 9 o’clock”)	5 mm ahead of aortic wall in a semicircular direction (until half aorta; “hour 3 o’clock”)

Lymph-Nodal Station Description: LN 16b2 - nodes around the abdominal aorta (from the upper margin of the inferior mesenteric artery to the aortic bifurcation)

Specific Notes:

This nodal area may overlap with the surrounding ones

LN 17	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	Bifurcation of Gastroduodenal Artery into Superior Pancreaticoduodenal and Right Gastroepiploic	Upper limit of the duodenal D2-D3 junction	10 mm from anterior pancreatic border	Pancreatic tissue beneath the pancreatic sheath	10 mm around the Superior and inferior Pancreaticoduodenal artery	10 mm around the Superior and inferior Pancreaticoduodenal artery

Lymph-Nodal Station Description: LN 17 - nodes on the anterior surface of the pancreatic head

Specific Notes:

The upper border level is the same of LN 6 but the other boundaries are specific to LN 17

LN 18	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	Inferior border of pancreas body/tail	10 mm from inferior border of pancreas body	10 mm from body/tail)	10 mm from body/tail	Left border of superior Mesenteric artery	End of Pancreatic Tail

Lymph-Nodal Station Description: LN 18 - nodes along the inferior margin of the pancreas

Specific Notes:

Check delineation by multiplanar reconstruction

LN 19	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	At a level of diaphragm ESOPHAGEAL Hiatus (at level of diaphragm pillars separation)	Level of their origin to the aorta (/or celiac trunk)	10 mm around inferior phrenic artery	10 mm around inferior phrenic artery	10 mm around inferior phrenic artery	10 mm around inferior phrenic artery

Lymph-Nodal Station Description: LN 19 - Infradiaphragmatic nodes

Specific Notes:

- To de drawn laterally to the diaphragm pillar

LN 20	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	Diaphragm Esophageal Hiatus (at level of diaphragm pillars separation) (to be checked on sagittal plane)	Diaphragm pillars closing	- Anterior limit of the diaphragmatic pillar	- Contouring around the Anterior surface of the Aorta (between hour "12" and "9" o'clock)	- Inner border of ipsilateral diaphragmatic pillar	- Inner border of ipsilateral diaphragmatic pillar

Lymph-Nodal Station Description: LN 20 - nodes in the esophageal hiatus of the diaphragm

Specific Notes:

- Follows esophagus through *iatus*;

- To be delineated within the space between diaphragm pillars (within diaphragmatic hiatus only);

LN 110	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	Inferior Border of the lowest (i.e.: left or right) inferior pulmonary vein	Diaphragm Esophageal Hiatus (at level of diaphragm pillars separation)	Anatomical boundaries (pericardium, lungs, vertebral bodies); Including all the periesophageal fat (Should be checked on sagittal plane)	Azygos vein plane/mid Aorta level; Including all the periesophageal fat	Anatomical boundaries (pericardium, lungs, vertebral bodies); Including all the periesophageal fat	Anatomical boundaries (pericardium, lungs, vertebral bodies); Including all the periesophageal fat

Lymph-Nodal Station Description: LN 110 - Paraesophageal nodes in the lower thorax

Specific Notes:

-Rounds the esophageal wall including the perivisceral fat;

LN 111	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	Most cranial level presenting posterior fatty tissue, posteriorly (i.e.: dorsally) to pericardium; Not strictly "periesophageal"	Diaphragm	Pericardium	Periesophageal fat tissue	Surrounding structures including (by different cranio-caudal levels): Lungs, Pericardium, Diaphragm, Vascular structures, others)	Surrounding structures including (by different cranio-caudal levels): Lungs, Pericardium, Diaphragm, Vascular structures, others)

Lymph-Nodal Station Description: LN 111 - Supradiaphragmatic nodes

Specific Notes:

-To be delineated by multiplanar reconstruction (particularly on sagittal plane);

LN 112	Upper Border	Inferior Border	Anterior Border	Posterior Border	Right Lateral Border	Left Lateral Border
Top	Level presenting posterior fatty tissue between Azygos and Aorta	End of Diaphragmatic Esophageal Hiatus (at level of diaphragm pillars separation)	Mid and Lateral Aorta level ("Hour 9 o'clock")	Azygos vein plane OR Vertebral Body (Leave 5 mm distance to Aorta)	Inner border of diaphragmatic pillar OR Lung	Aorta

Lymph-Nodal Station Description: LN 112 - Posterior mediastinal nodes