Protocol of Radiotherapy for Gastric Cancer

■ Indications for radiotherapy
  ■ Indications for preoperative chemoradiation
    ◆ T2-T4, any N, M0
  ■ Indications for definitive chemoradiation
    ◆ Medically fit, unresectable (any T, any N, M0)
    ◆ Medically unfit (T1b-T4, any N, M0)
  ■ Indications for postoperative chemoradiation (if patients have not received preoperative chemoradiation)
    ◆ T2N0M0 (only for selected patients having high risk features including poorly differentiated, higher grade cancer, lymphovascular invasion, neural invasion, or <50 years of age or patients who did not undergo D2 lymph node dissection).
    ◆ T3-T4, any N, M0
    ◆ Any T, N+, M0
    ◆ R1 or R2 resection

■ Simulation and Treatment Planning
  ■ Use of CT simulation and 3D treatment planning is strongly encouraged.
  ■ IMRT may be used in clinical settings where reduction in dose to organs at risk is required that cannot be achieved by 3-D techniques.
  ■ The patient should be instructed to avoid intake of a heavy meal for 3 hours before simulation and treatment. When clinically appropriate, use of IV and/or oral contrast for CT simulation may be used to aid in target localization.
  ■ Use of an immobilization device is strongly recommended for reproducibility of daily set-up.
  ■ It is optimal to treat patients in the supine position at the setup is generally more stable and reproducible.
  ■ The uncertainties arising from variations in stomach filling and respiratory motion should also be taken into consideration.

■ Target Volume
  ■ General Guidelines
    ◆ Preoperative: Pre-treatment diagnostic studies should be used to identify the tumor and pertinent nodal groups. The relative risk of nodal metastases at a specific nodal location is dependent on both the
site of origin of the primary tumor and other factors including width and depth of invasion of the gastric wall.

◆ Postoperative: Pre-treatment diagnostic studies and clip placement should be used to identify the tumor/gastric bed, the anastomosis or stumps, and pertinent nodal groups. Treatment of the remaining stomach should depend on a balance of the likely normal tissue morbidity and the perceived risk of local relapse in the residual stomach. The relative risk of nodal metastases at a specific nodal location is dependent on both the site of origin of the primary tumor and other factors including width and depth of invasion of the gastric wall.

■ Proximal one-third/Cardia/Esophagogastric Junction Primaries

◆ Preoperative and Postoperative: With proximal gastric lesions or lesions at the EG junction, a 3- to 5- cm margin of distal esophagus and nodal areas at risk should be included. Nodal areas at risk include perigastric, celiac, splenic hilar, and porta hepatic lymph nodes.

■ Middle one-third/Body Primaries

◆ Preoperative and Postoperative: Nodal areas at risk include: perigastric, suprapancreatic, celiac, splenic hilar, porta hepatic, and pancreaticoduodenal lymph nodes.

■ Distal one-third/Antrum/Pylorus Primaries

◆ Preoperative: 1st and 2nd part of duodenum should be included if the gross lesion extended to the gastroduodenal junction. Nodal areas at risk include: perigastric, suprapancreatic, celiac, portahepatic, and pancreaticoduodenal lymph nodes.

◆ Postoperative: a 3- to 5- cm margin of duodenal stump should be included if the gross lesion extended to the gastroduodenal junction. Nodal areas at risk include: perigastric, suprapancreatic, celiac, portahepatic, and pancreaticoduodenal lymph nodes.

■ At least 1 cm margin should add to CTV to create PTV.

■ Radiation dose

• 45 to 50.4 Gy (1.8 Gy/day)

• Once daily, 5-6 fractions per week.

• For patients with gross or microscopic residual diseases, a field reduction technique is recommend for boost to over 50 Gy (50 to 55 Gy)

• Modification of above prescribed dose should be considered according to each patient’s condition
Constraints of OAR

- Liver: 60% of liver < 30 Gy, <25 Gy mean dose.
- Kidneys: at least 2/3 of one kidney < 20 Gy
- Spinal cord < 45 Gy
- Heart: 1/3 of heart < 40 Gy, effort should be made to keep the left ventricle doses to a minimum
- Lungs: every effort should be made to keep the lung volume and doses to a minimum.
- Modification of above constraints should be considered according to each patient’s condition.

References