INTRODUCTION:

The incidence of pancreatic cancer is 43,920 estimated new cases in 2012, with an even split between males and females. Approximately 37,390 people will die of pancreatic cancer resulting in the fourth most common cause of cancer-related death among the U.S. population. The incidence of mortality rates has remained constant. Pancreatic cancer typically occurs later in life. Risk factors include smoking, alcohol use, obesity, diabetes, and certain chemical exposures. Pancreatitis has also been shown to have an increased risk of developing pancreatic cancer. Surgical resection is potentially the only curative approach, but most patients present with more advanced stage disease. Overall, the actuarial five-year survival rate is approximately 20%.

A number of post-operative clinical trials have looked at the role of chemoradiation. At this time, however, no definite standard has been established in the adjuvant treatment for pancreatic cancer. The National Comprehensive Cancer Network Guidelines state that although the optimal combination and sequencing of adjuvant radiation therapy has yet to be defined, post-operative radiation therapy, when given, should be administered at a dose of 45-46 Gy (1.8-2.0 Gy per day) with high energy photons (>4 MV) to the tumor bed, surgical anastomosis, and adjacent lymph node regions, followed by an additional 5-15 Gy to the tumor bed, with special attention to dose to the small bowel. It is strongly advised that CT-based simulation and 3D treatment planning are used together with pre-operative CT scans and surgical clips. Radiation therapy is typically given in combination with chemotherapy (continuous infusion 5-FU, capecitabine, or gemcitabine).

The goal of these guidelines is to delineate appropriate indications of the employment of radiation therapy in the treatment of pancreatic cancer and to define suitable methods of delivery of radiation therapy for these indications.

INDICATIONS FOR RADIATION THERAPY:

2D and 3D conformal radiation therapy techniques are considered medically necessary for treatment of pancreatic cancer.

Neoadjuvant (Pre-Operative) or Resectable or Borderline Resectable without evidence of metastatic

- No standard treatment regimen currently exists for this subset of patients. If neoadjuvant radiation therapy is delivered, a dose of 45-54 Gy in 1.8-2.5 Gy fractions or 36 Gy in 2.4 fractions are viable options.

Adjuvant (Post-Operative) Resectable Without Evidence of Metastatic Disease
• For resected cases (45-46 Gy in 1.8-2 Gy fractions) to the clinical target volume, followed by boost (5-9 Gy). Up to 31 fractions.

**Unresectable/Locally Advanced Without Evidence of Metastatic Disease**
• Radiation delivered in 45-54 Gy (1.8-2.5 Gy fractions or 36 Gy in 2.4 fractions). Up to 30 fractions.

**Palliative**
• Radiation delivered in 25-36 Gy in 2.4-3.0 Gy fractions is usual for patients with metastatic disease who require palliation for obstruction or pain. Up to 15 fractions.

**Local Recurrence after Resection Without Evidence of Systemic Metastatic Disease**
• Adjuvant chemotherapy or chemoradiation if no previous radiation given

**TREATMENT OPTIONS REQUIRING PHYSICIAN REVIEW:**

**Intensity Modulated Radiation Therapy (IMRT)**
IMRT is not indicated as a standard treatment option and should not be used routinely for the delivery of radiation therapy for pancreatic cancer. IMRT is strictly defined by the utilization of inverse planning modulation techniques. IMRT may be appropriate for limited circumstances in which radiation therapy is indicated and 3D conformal radiation therapy (3D-CRT) techniques cannot adequately deliver the radiation prescription without exceeding normal tissue radiation tolerance, the delivery is anticipated to contribute to potential late toxicity or tumor volume dose heterogeneity is such that unacceptable hot or cold spots are created.

Clinical rationale and documentation for performing IMRT rather than 2D or 3D-CRT treatment planning and delivery will need to:

• Demonstrate how 3D-CRT isodose planning cannot produce a satisfactory treatment plan (as stated above) via the use of patient specific dose volume histograms and isodose plans.

• Provide tissue constraints for both the target and affected critical structures.

**Stereotactic Body Radiation Therapy (SBRT)**
Stereotactic Body Radiation Therapy (SBRT) is not currently an approved treatment option for the treatment of pancreatic cancer. Recent studies comparing SBRT conventional radiation therapy are limited. If requested, this would require peer to peer review to determine medical necessity.

**Proton Beam Radiation Therapy**
Proton beam is not an approved treatment option for pancreatic cancer. Proton beam has not been proven superior treatment to conventional radiation therapy.

**Intra Operative Radiation Therapy (IORT)**
The role of interoperative radiation therapy for pancreatic cancer is controversial, but may be reasonable for patients undergoing resection that may result in closer involved margins. IORT may be considered on a case by case basis.
REFERENCES


Koong, A.C., Christofferson, E., Le, Q.T., Goodman, K.A., Ho, A., Kuo, T., ... Yang GP.


