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News Highlights From February's *Journal of Vascular and Interventional Radiology (JVIR)*

Interventional Radiologists Offer Liver Cancer Patients a Treatment Option With Nonsurgical Microspheres

Properly Selected Patients Can Benefit and Gain Time

A study in February's *Journal of Vascular and Interventional Radiology* found that patients undergoing liver cancer treatment with Theraspheres[®], radioactive microspheres containing Yttrium-90, can tolerate a 150 Gy single dose or 268 Gy repeated dose without risk of radiation-induced liver disease. This paper looked at the pretreatment factors and radiation dose levels that affected toxicity that could be used to determine which patients can benefit from Theraspheres.

Many patients with liver cancer have impaired liver function due to underlying cirrhosis and/or the tumors themselves. Thus, they are at increased risk for liver toxicity from any liver cancer treatment. In the United States, approximately 50-60 percent of patients with primary liver cancer, or hepatocellular carcinoma, die of tumor progression and 40-50 percent die from advancing cirrhosis and subsequent liver failure.

Although surgical removal of liver tumors offers the best chance for a cure, it is not possible for more than three-fourths of primary liver cancer patients and 90 percent of patients with secondary liver cancer. For these patients, this new nonsurgical treatment offers them an option that can give them more time. "Because systemic therapy has the potential to induce toxic effects without an associated benefit, reliance on the use of local and regional treatments like radioembolization is expanding in the United States," stated study author Riad Salem, MD, MBA, interventional radiologist, Northwestern University.

The study showed that the risk of toxicity from the treatment appeared to be related to the patient's pre-treatment total bilirubin level and the mean liver radiation dose. Since bilirubin levels can be used as an indicator of liver function and predict a possible predisposition for liver toxicity, they can help interventional radiologists select patients for this treatment. In this study, liver toxicity occurred in 42 percent of the patients; however, most of the toxicities resolved after treatment and those that did not were attributed to tumor progression or advancing cirrhosis. In the patients studied, radiation-induced liver disease was not observed, and no patient died of liver failure attributed to treatment.

About Yttrium-90 Radioembolization

Radioembolization incorporates the radioactive isotope Yttrium-90 into the embolic spheres to deliver radiation directly to the tumor. Each sphere is about the size of five red blood cells in width. An interventional radiologist injects these beads through a catheter from the

femoral artery in the groin to the liver artery supplying the tumor. The beads become lodged within the tumor vessels where they exert their local radiation that causes cell death. This technique allows for a higher, local dose of radiation to be used, without subjecting healthy tissue in the body to the radiation. The Yttrium-90 radiates from within and, since it is administered in the hepatic artery, can be viewed as “internal” radiation. This treatment is approved by the Food and Drug Administration for the treatment of unresectable hepatocellular carcinoma, or as a bridge to transplantation.

Radioembolization is a palliative, not a curative, treatment—but patients benefit by extending their lives and improving their quality of life. It is a relatively new therapy that has been effective in treating primary and metastatic liver cancers. It is performed as an outpatient treatment. There are fewer side effects from this treatment compared to standard cancer treatments, with the main one being fatigue for seven to 10 days.

Yttrium-90 Microspheres Risk Stratification

A sister study released in the February *JVIR*, *Yttrium-90 Microspheres Risk Stratification*, identified risk factors for predicting which patients would benefit from this treatment. Researchers were able to determine five liver-related risk variables that were most strongly associated with three-month mortality after treatment: high-risk: infiltrative disease, bulk disease, AST/ALT > 5 x normal, tumor volume >50%, and albumin < 3 gm/dl, bilirubin > 2 mg/dl. In this study, patients in the high-risk group had a median survival after treatment of 108 days, compared to 466 days for low-risk patients.

“Weighing the risks versus benefits of this treatment must be carefully considered on an individual basis because of the potential for liver injury,” commented Riad Salem, MD, MBA, study investigator. He added, “Objective pre-treatment risk stratification criteria would be helpful in this endeavor.”

About Interventional Radiologists

Interventional radiologists are board-certified physicians who specialize in minimally invasive, targeted treatments performed using imaging for guidance to treat diseases nonsurgically through the blood vessels or through the skin. By combining diagnostic imaging expertise with advanced procedural skills, interventional radiologists perform minimally invasive treatments that have less risk, less pain, and less recovery time than open surgery. Interventional radiologists pioneered minimally invasive modern medicine with the invention of angioplasty and the catheter-delivered stent, which were first used to treat peripheral arterial disease. More information can be found at www.SIRweb.org. Visit www.JVIR.org to view the published articles.

For a copy of the Society of Interventional Radiology’s new media primer on interventional radiology which includes an oncology section, email Comm@SIRweb.org.

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