Improving Outcomes: Exploring the Benefits of SIRT Using SIR-Spheres® microspheres in Patients with Metastatic Colorectal Cancer

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Introduction

Selective Internal Radiation Therapy (SIRT) using SIR-Spheres® microspheres received FDA PMA approval in 2002 for the treatment of unresectable metastatic liver tumors from primary colorectal cancer with adjuvant intra-hepatic artery chemotherapy (IHAC) of FUDR (Flouxuridine). Recent peer-reviewed data suggest SIRT can improve patient outcomes related to response rate, time-to-tumor progression and overall survival when compared to other conventional treatment options.1,2 SIR-Spheres microspheres are microscopic polymer beads that contain the radioactive isotope Y-90 and emit beta radiation to kill cancer cells. Due to their small size (~average size 32.5 microns), they travel easily through the bloodstream directly to the liver. The microspheres become lodged in the tumor vasculature and kill the cancer cells by emitting beta radiation to the tumors, while the surrounding healthy liver tissue remains unaffected.

Patient History

A 46 year-old male patient was diagnosed with metastatic colorectal cancer (mCRC) in 2010 after routine colonoscopy. He initially pursued alternative medical therapies but presented several months later with colonic obstruction from his primary lesion. In November 2010, surgical resection was attempted but abandoned due to tumor involvement with the superior mesenteric vein and mesentery, and a colonic bypass was performed.

In January 2011, patient began FOLFOX (oxaliplatin, 5-Fluorouracil, leucovorin) chemotherapy. After the first course the hepatic metastases and primary lesion decreased in size, and FOLFOX was continued.

After the second course of therapy, the hepatic metastases were shown to be increasing in size and number. In April 2011, the patient underwent additional systemic chemotherapy treatments with regimens containing irinotecan, cetuximab and bevacizumab. In July 2011, CT and MRI scans identified approximately 17 liver metastases in both hepatic lobes. The patient was referred to the interventional radiology team for liver directed therapy. He was a suitable candidate for SIRT with SIR-Spheres microspheres, based on his ECOG status (0) and liver profile (bilirubin 0.4, Alkaline Phosphatase 75, AST 24, ALT 24).

Procedure

In October 2011, after first determining lung shunt, the first SIRT procedure was performed to the right lobe of the liver. During this outpatient procedure, we administered 41mCi in the form of SIR-Spheres microspheres (beta radiation). Selective placement of a microcatheter (1 mm in diameter) into the right hepatic artery allowed for delivery of the microspheres to the tumors in the right lobe. Due to increased vascularity of the metastases compared with normal surrounding liver, the microspheres were deposited preferentially within the tumors. One month later, in November 2011, the patient underwent a second SIRT procedure to the right lobe of the liver. Pre-treatment Coronal image from a whole body PET showing numerous hepatic lesions representing metastases. Note activity indicating primary transverse colon tumor in mid abdomen.

Post-treatment Coronal image from a whole body PET showing no evidence of activity within hepatic metastases. Activity in mid abdomen represents primary tumor.
left lobe of the liver metastases, with administration of 13mCi of SIR-Spheres® microspheres. The patient tolerated the procedure well and showed no side effects from treatment.

He continued chemotherapy treatments during the timeframe in which the SIRT treatments were administered.

Results

The first follow-up PET/CT and MRI in December 2011, two months after the first SIRT treatment, showed a dramatic response to the SIR-Spheres microspheres therapy in both lobes with no evidence of active hepatic disease.

PET/CT scans in April 2012, six months following the initial SIRT treatment, showed minor activity less than 2 cm in one lesion in the left lobe. The patient has continued with chemotherapy and will be re-evaluated with a PET/CT in early July 2012.

Conclusion

A patient with unresectable liver tumors who had multiple colorectal liver metastases was successfully treated with Y-90 resin microspheres. The six-month post-treatment PET/CT revealed no tumor activity in the liver, however, FDG uptake, indicating tumor activity, was present in the primary colon tumor.

One of the benefits of SIRT using SIR-Spheres microspheres is that most patients with mCRC can continue their chemotherapy regimens without interruption, which was the case with this patient. SIRT should be considered as a valid therapeutic option for patients with chemotherapy-refractory liver-limited or liver-dominant mCRC. With proper patient selection the procedure is well tolerated with a low incidence of severe complications.

About the Author

Mark Westcott, M.D., graduated with honors from the University of Notre Dame. He attended Georgetown University Medical School and trained in Diagnostic Radiology at Northwestern Memorial Hospital in Chicago. He then completed a fellowship in Interventional Radiology at Thomas Jefferson University Hospital in Philadelphia.

Dr. Westcott is board-certified by the American College of Radiology in both Diagnostic Radiology and Interventional Radiology. He received the Certificate of Added Qualification in Diagnostic and Interventional Radiology in 1996. He has been in practice since 1994 and joined Lenox Hill Hospital in the spring of 2002.
