Interventional Oncology: Adding Options to the Care of Patients with Cancer

Daniel B. Brown, MD

Last spring, the husband of a patient I treated in 2004 unexpectedly contacted me. I initially met with him and his wife to discuss salvage treatment options for her metastatic colorectal cancer (CRC). After a right hepatectomy to treat metachronous metastases from her colon cancer, she had developed a new 3-cm focus deep in segment 4. The tumor had progressed on oxaliplatin and irinotecan. The hepatobiliary surgeon was hesitant about repeat surgery, out of concern that her short disease-free interval might portend rapid development of widespread metastatic disease. Her medical oncologist and surgeon inquired whether any percutaneous options were available for the new metastasis.

During the clinic visit, the anxiety felt by the patient and her husband was palpable. Young and previously healthy, she had exhausted standard therapeutic options. Fortunately, my group was able to successfully perform radiofrequency ablation on the metastasis. We followed up with her in our clinic, and a year later she developed a new retroperitoneal focus that we also ablated.

Over time, I moved to a new institution and was no longer directly involved in her care. The most recent communication was a heartfelt thank you from her husband for helping to provide her with a cancer-free decade because she remained not only alive but also disease-free 10 years after treatment.

Anecdotal outcomes surpassing expectations are one of the strongest positive reinforcements clinicians receive, but this patient’s clinical course also provides relevant insights into the current status of interventional oncology, particularly as it relates to treatment options for liver metastases from CRC. Minimally invasive image-guided treatments, such as chemoembolization, radioembolization with yttrium-90 (90Y) microspheres, and thermal ablation, are increasingly being used in the United States. Current indications for these treatments are part of several NCCN Guidelines. Ablation is the preferred treatment modality in renal cell carcinoma for surgical candidates with suboptimal health, and outcomes appear similar to those of partial nephrectomy for patients with T1a tumors. Transarterial therapies are recommended for progressive liver metastases in many patients with neuroendocrine tumors. Transarterial therapies and ablation are also the preferred treatments for patients with unresectable hepatocellular carcinoma.

Complete resection of hepatic metastases from CRC that has spread to the liver can be curative; this option is the gold standard and will remain so. However, given that only 10% to 20% of patients are candidates for resection, the overwhelming majority of patients with liver-dominant metastatic disease survive only as allowed by systemic or biologic agents. This bleak prognosis has led to more aggressive measures for patients with unresectable disease, including maximal operative debulking supplemented by ablation of remaining disease.

Given the expansion of potential surgical strategies for cure, it is worth reevaluating palliative options, including whether 90Y provides benefit within the first 2 lines of systemic therapy. Enthusiasm in the oncology community regarding the benefit of 90Y for CRC metastases remains mixed at best. These reservations are understandable, because much of the literature contains anecdotal reports, and, similar to my patient, are from single-center retrospective experiences with limited sample size. The issue of prospective data is being addressed: multiple large-scale prospective randomized trials comparing first- and second-line therapy with and without 90Y are in progress. An additional randomized prospective trial is evaluating 90Y plus chemotherapy as part of maintenance therapy after first-line FOLFOX/bevacizumab versus maintenance therapy alone.
Prospective trials are challenging to develop and complete, and trials in interventional oncology are no different in this regard, a limitation that has been accurately noted in this space. Interventional oncology is the first subspeciality of interventional radiology, resulting from rapid technologic advances in the past decade. This growth has required development of collaborative networks to generate prospective, large-volume data. Given the variable penetration of interventional oncology procedures at different institutions, these networks are principally at higher-volume tertiary or quaternary cancer centers outside traditional oncology groups.

Unfortunately, most patients with CRC receive first- and second-line treatment at community-based outpatient centers, which makes enrollment onto trials combining $^{90}$Y with chemotherapy challenging. This is a well-known obstacle to many academic medical oncologists. Additionally, some oncology specialists may be hesitant to consider these new and potentially disruptive techniques from a group of less-established potential collaborators. As an eager junior faculty member, I was the lead site investigator for an NCI-funded prospective study focusing on the use of thermal ablation for painful skeletal metastases. Despite multiple meetings with different radiation and medical oncologists, posting a variety of institutional review board–approved materials promoting the study, and speaking at several regional hospitals, we were only able to generate a scant few referrals over the study period. Our experience was similar to several other centers; however, a small group of hospitals was able to recruit patients quite easily because referring physicians saw potential value in ablation. Ultimately, only a handful of the original centers were able to contribute to the final manuscript, although the study showed that radiofrequency ablation was beneficial with significant pain reduction in treated patients.

The collaborative energy of the ongoing CRC trials is encouraging because the combination of systemic and locoregional therapies will hypothetically provide some systemic control while focusing on liver-dominant disease. In the absence of solid evidence, $^{90}$Y is most commonly performed after these options are exhausted in the salvage setting. Numerous studies have consistently demonstrated that survival using $^{90}$Y for liver-dominant disease after progression on second-line therapy ranges from 10 to 12 months. This outcome is comparable with outcomes from the prospective evaluation of $^{90}$Y for salvage and several trials using systemic therapy in this setting. Ideally, more trials evaluating salvage by combining $^{90}$Y and systemic or biologic therapy will be performed to determine how to improve this outcome as well.

Obviously, not all patients have the same result as our fortunate patient described at the start of this article, but this only reinforces the need for current prospective randomized studies. There is strong enough evidence of benefit to some patients to formally research integration of $^{90}$Y and other locoregional treatments into the care of patients with CRC, with the goal of determining which patients are most likely to benefit. Ultimately, the best use remains to be determined. With the multiple ongoing trials and many more under development for a variety of neoplasms, I remain eager that our collaborative colleagues understand our commitment to clinical trials designed to offer patients with cancer more options to maximize quality of life and survival.

References