The Role of Interventional Oncology in Multidisciplinary Tumor Boards

An analysis of the interventional oncologist's impact on cancer patient care as part of a multidisciplinary tumor board.

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The interventional oncology (IO) revolution represents one of the fastest growing areas of interventional medicine and has become an essential piece of comprehensive cancer care. Interventional procedures are integral to a patient's cancer journey from the time of diagnosis to the time of palliative management. With systemic, surgical, and locoregional procedure options available, navigating and sequencing IO therapies rather than fighting for a particular procedure has become a fundamental role for the interventionist in the new cancer therapy paradigm.

WHAT IO BRINGS TO THE TABLE

The procedures and therapies interventionists can perform are extensive. With greater understanding of the disease, combined with technologic advancement, refinement of techniques, and the development of new procedures, interventionists will continue to improve patient outcomes with respect to lower costs, faster recovery, improvement in quality of life, and survival benefit. The IO procedures and treatments interventionists use to treat cancer can be organized into the categories shown in the *Sidebar*.

MULTIDISCIPLINARY TUMOR BOARDS

A shift in the attitudes toward the role of IO in cancer treatment and patient care can be seen in many of our institutions. The adoption of new therapies and processes must be discussed in the context of multidisciplinary care, which is the primary rationale of the multidisciplinary tumor board. The multidisciplinary tumor board is the development of an agnostic, patient-centered approach based on local expertise and input that facilitates a best care model and provides an individualized context and continuum of care. Prior to the introduction of multidisciplinary tumor boards, the traditional care model consisted of a single point of care (often the medical oncologist) to receive counsel and advice on the most appropriate course of action. In most cases, that treatment plan would consist of systemic chemotherapy in standardized algorithms, with diminishing return (and increased side effects) for the progression of disease and therapy. More recently, interest in locoregional therapies, such as ablation and embolization, has grown, predicated on the established role of surgical resection for curative intent in select situations, particularly in the gastrointestinal tract, kidneys, and lungs. The active participation of all members of the multidisciplinary tumor board, including medical, surgical, radiation, and interventional oncologists, at initial presentation ensures that all options that may lead to a cure and a strategy regarding the sequencing of therapies in the noncurative setting are explored.

In our own experience, the multidisciplinary tumor board was formed out of a common interest between

TYPES OF IO PROCEDURES USED TO TREAT CANCER

Adjunctive procedures
- Intended to convert patients from nonsurgical or treatable status (eg, portal vein embolization) or procedures that can augment backbone therapy (eg, ablation, selective internal radiation therapy)

Curative procedures
- Intended to eradicate visible disease using techniques such as ablation

Palliative procedures
- Neurolysis, osseous stabilization and reconstruction (eg, acetabuloplasty, vertebroplasty), and embolization for symptoms such as bleeding or paraneoplastic syndromes

Ancillary procedures
- Biopsy, fiducial marker placement, venous/vascular access, drainage, fluid management, thrombolysis, inferior vena cava filter placement, and other procedures essential to cancer care but not considered primarily therapeutic

surgical specialties and IO to help discuss the appropriateness and sequencing of therapy for patients undergoing liver-directed therapies in an informal setting. After 12 years, this collaborative effort has resulted in institutional funding support and active participation of multiple specialties, evolving into the de facto expert group for the management of primary and metastatic liver cancer. Similar multidisciplinary tumor boards have been formed in our institution for small renal tumors, lung tumors, and pancreatic cancer, with active participation by IO.

The multidisciplinary tumor board plays a multifactorial role in bridging the gap between expert consensus panels and choosing the most appropriate care for an individual through the following means:
- Optimize patient care through identification of all available options
- Ensure compliance and reasonable approaches to therapy
- Reinforce collaborative approach to insurance providers
- Provide best evidence and continual updates on innovation among all stakeholders
- Offer cross specialty knowledge translation
- Deliver expedient referral and care

For institutions that have not established a critical mass to form a multidisciplinary tumor board (either due to a small patient population or logistic challenges), expert and consensus panels provide algorithmic guidance to treatment but may not reflect local expertise or availability of therapy.

DISPLAYING THE ROLE OF IO IN MULTIDISCIPLINARY TUMOR BOARDS

Although multidisciplinary tumor boards can be centered around several different focal points, IO has established a critical role in the hepatopancreaticobiliary arena, and for illustrative examples, a brief discussion surrounding the interventional oncologists' role in the setting of hepatocellular carcinoma (HCC) and metastatic colorectal carcinomas will outline the involvement of IO in a surgically driven disease (HCC) and a medical oncology/systemically driven disease (colorectal liver metastasis [CRLM]).

Case Study: Incorporating IO With Surgical Therapy in HCC

HCC is a result of chronic inflammation of the liver, often caused by viral hepatitis, alcohol-induced cirrhosis, or metabolic disorders such as sclerosing cholangitis, or primary biliary cirrhosis, leading to malignant transformation of the organ as a whole due to compromised liver function. As a result, prior to the introduction of systemic therapy, the approach to HCC had been driven by liver transplant and resection. For those cases where neither was possible, survival benefit has only been proven through chemoembolization.[1] Since the introduction of new embolics (eg, drug-eluting beads, radioembolization) and new methods of curative intent therapy through ablation (irreversible electroporation, microwave ablation, radiofrequency ablation, cryoablation), the multidisciplinary tumor board has evolved into a complex interaction among specialists back to surgical resection or control of visible disease through various techniques.

Each of the previously mentioned therapies may have niche indications or potential benefits in specific situations, but for many patients, the reality is that without organ transplantation, multicentric disease will continue to present itself in the chronically inflamed hepatic parenchyma. As a result, there is a very high likelihood that the patient will undergo a series of therapies over the course of their disease, which in turn requires the preemptive planning for treatment to consider what reasonable current offerings are available both in the context of the compromised liver and future recurrence of disease. Discussions regarding the types and approaches to ablation and embolization must be conducted in the context of the intent for therapy and the likelihood of success. Without the input of IO, the significant gap between liver transplant and palliative systemic therapy (with marginal benefit and high toxicity) would not be bridged.

Case Study: Melding IO With Systemic Therapy in CRLM

CRLM is recognized as a systemic disease, as opposed to HCC, which is commonly recognized as a disease restricted to and originating in the liver. As such, CRLM represents the opposite end of the spectrum with respect to historic approaches to the management of disease, requiring an approach that will first and foremost provide systemic therapy with the conventional vernacular centered around the concept of "lines" and "cycles" of chemotherapy. In brief, patients will initiate therapy with systemic first-line chemotherapy (eg, FOLFOX, FOLFIRI, or FOLFOXIRI, along with a biologic agent such as bevacizumab) and, upon reaching the dose toxicity limit, progress onto second line and so forth, with latter lines resulting in diminishing response and/or increasing toxicity.[2]

In addition, all patients diagnosed with CRLM restricted to the liver should be given the chance for potentially curative liver resection. Although recurrence rates are high within the liver (up to two-thirds of patients will exhibit recurrence of disease), the curative intent cytoreductive strategy (surgery or ablation) has demonstrated clear survival benefit. Adjunct procedures designed to downstage or convert nonsurgical patients to surgical resection (eg, portal vein embolization or transarterial radioembolization) may segue the patient into a completely different cancer care pathway. For those without the option of elimination or removal of visible disease, techniques such as selective internal radiation therapy with resin-based yttrium-90 radioactive microspheres have demonstrated robust depth of response and significant prolongation in progression-free survival for liver-specific disease.[3] Similar findings, but at a lower level of evidence, utilizing irinotecan-loaded drug-eluting microspheres have also been demonstrated.

CONCLUSION

As the oncology landscape continues to evolve, the role of the interventional oncologist becomes more critical. For instance, precision medicine and proteogenomic mapping of tumors has the potential to elucidate the metabolic pathways and their vulnerabilities that may transform systemic cancer care approaches and are predicated on quality biopsies and image-guided sampling of small/targeted regions of interest with the tumor. In another example, immuno-oncology has the potential to change the landscape of systemic therapy by activating the body's own immune system to surface receptors on cancer, which has been shown in animal models to be more effective with adjunctive ablation or radioembolization strategies. Finally, pain control and quality of life has been demonstrated to be dramatically improved in patients undergoing percutaneous bone stabilization procedures, while decreasing narcotic use, hospitalization, and depression.

The maturation of IO as a distinct practice has addressed critical unmet needs in oncologic care. With this in mind, given the complex nature of the disease, cancer teams have gravitated toward the multidisciplinary tumor board concept to ensure that best evidence can be applied with local expertise to provide a personalized approach to cancer care. The interventional oncologist has earned a legitimate role as a key player in the multidisciplinary tumor board with therapies that are unique, cost-effective, and ultimately make a difference to the lives of our patients. ■

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