State of Oncology Pharmacotherapy

Mark T Holdsworth

The past 40 years have seen the birth and maturation of clinical pharmacy practice across various disciplines. When *Drug Intelligence* was first launched, clinical pharmacy was much more conceptual than an actual practice. At that time, the field of oncology was also in relative infancy. During the 1960s, there were few well-developed treatment protocols for specific cancers, a lack of effective chemotherapeutic agents, as well as little recognition of true multidisciplinary care. In fact, the first edition of what is considered the "bible" for cancer treatment was not published until 1982.[1] Oncology research was also in its very early stages during this time, and federal regulations governing the conduct of clinical research were not even put into practice until the 1980s. Clinical research has now yielded major advances in the outcome of many oncology patients, particularly in the pediatric arena, and clinical pharmacy oncology practitioners have contributed to many of these research advances.

It is difficult to imagine the state of clinical oncology practice in these early days and how pharmacy practitioners may have contributed to patient outcomes in this primordial period. I believe that pharmacy involvement during this time was primarily one of distributive support, with perhaps occasional clinical consultative and/or research support. It is also likely that the iterative and empirical approaches to patient care and antitumor therapy during this time identified important concepts regarding future chemotherapy regimen design, as well as critical dosing paradigms. In other words, many mistakes were likely made during this early time of oncology practice. Today, most malignancies have well defined therapeutic approaches, and multiagent chemotherapy is heavily featured for the majority of adult and pediatric cancers. Identification of effective treatment strategies is a moving target, and current therapy continues to grow in complexity in terms of the number and schedule of effective agents. This therapeutic complexity is a definite opportunity for pharmacy involvement.

Over the past 40 years, effective supportive care regimens for cancer patients have also been developed. In particular, in recent years, hematopoietic growth factors, effective antiemetic agents, central venous catheters, appropriate use of opioids for pain, conscious sedation for painful procedures in pediatric oncology, and effective antibiotic strategies for febrile neutropenia have contributed to marked improvements in the quality of life of patients with cancer. While some may consider supportive care advances to be relatively minor in the grand scheme of anticancer therapy, from a patient's perspective, these advances are pivotal. Pharmacy practitioners have often assumed important roles in the supportive care arena and frequently make important contributions to the design and management of these therapies for the oncology patient population.

Throughout the process of increased therapeutic complexity both in terms of antitumor treatment and supportive care regimens, pharmacy practitioners have also often made important contributions to ensuring rational protocol design, as well as safe and effective delivery of drugs used in oncology. Today, clinical pharmacists are at the front line in developing systems improvements to prevent or mitigate the effects of adverse drug events. These untoward events often are amplified in the oncology arena since agents are administered at or near the maximum tolerated dose. In addition, clinical pharmacy researchers in academic institutions are now making important contributions to further optimize antitumor therapy, in particular, by conducting investigations that examine pharmacokinetics, pharmacodynamics, and/or pharmacogenomics that lead to therapeutic improvements. In the oncology arena, perhaps the most significant accomplishment of clinical pharmacy over the past 40 years is the recognition by oncologists across the nation that pharmacists specializing in

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oncology are an important and necessary component of the multidisciplinary care team that is needed to care for patients with cancer.

While clinical pharmacy has made great strides in the past 40 years within oncology practice, it is important to acknowledge that we are still behind the advances of other professions. For example, both the medical and nursing professions have board certification at the subspecialty level (eg, pediatric oncology), but our profession has only recently developed general board certification in oncology. I believe that we will soon be catching up to the other professions, as board certification in oncology pharmacy is among the fastest growing areas of Board of Pharmaceutical Specialties certification. In addition to profession certification, pharmacy must begin to make further strides on the national stage to make the public aware of our significant contributions to oncology practice. The recent selection of a PharmD to head St. Jude's Childrens Research Hospital is a promising accomplishment and will help to set the stage for pharmacy's future in the oncology arena. Clinical pharmacists are now major players in everyday oncology practice, and it should not be long before it is common knowledge that when our presence is lacking, patient outcomes will suffer.

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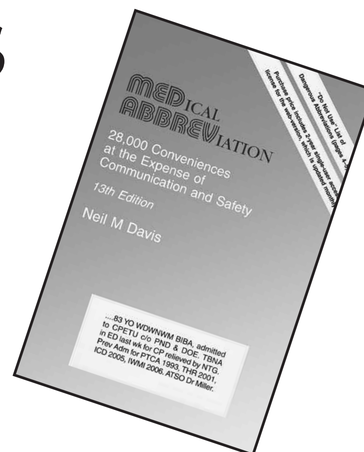

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