

Challenges for optimal care in onconephrology

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Onconephrology, the intersection of cancer and kidney disease, is a rapidly growing subspecialty. Advancements in oncologic treatments have improved patient survival rates, increasing the likelihood of kidney diseases [1]. Treating these complex patients requires nephrologists to have confidence in managing such conditions. Therefore, there is an urgent need to train more onconephrologists for this growing patient population. Consequently, as a field, onconephrology faces complex challenges. In this article, we explore the major obstacles facing onconephrology today and potential solutions (summarized in Table 1).

The first challenge involves the decline in the nephrology workforce. The shortage of general nephrologists is a growing concern due to the increasing number of patients with kidney disease. In 2013, there were reportedly 1666 patients with chronic kidney disease (CKD) for every one nephrologist, a ratio that has likely increased in recent years [2]. This presents a problem, particularly for cancer patients, 50% of whom have a reduced estimated glomerular filtration rate (eGFR) at baseline, indicating some degree of CKD, and up to 25% have an eGFR <60 mL/min [1]. Without enough specialists to meet demand, patients may face long wait times for appointments and suboptimal management of kidney disease, leading to poorer outcomes.

While direct evidence specifically supporting the value and cost-effectiveness of specialized care provided by onconephrologists is limited, these subspecialists possess a unique skill set and knowledge base to navigate the complexities of cancer and kidney disease [3]. They offer targeted interventions, including adjusting anticancer agents to minimize renal toxicity and managing treatment-related complications [3]. As part of the cancer care team, the highly specialized care provided by onconephrologists aligns with the principles of personalized medicine, delivering comprehensive care and holding promise for optimizing patient outcomes. However, additional data are needed to establish the tangible benefits and cost-effectiveness of onconephrology involvement.

The creation of comprehensive and multidisciplinary onconephrology teams has been recommended to provide holistic care for patients with cancer and kidney disease [3]. While direct evidence of the clinical and financial value of these teams may be scarce, the concept of multidisciplinary care has been widely recognized and implemented in various medical specialties and

large cancer centers. Collaborative teams involving nephrologists, oncologists and other specialists can leverage their collective expertise to optimize patient outcomes, coordinate care and potentially enhance resource utilization.

To address the lack of interdisciplinary care incorporating onconephrologists, several approaches could be implemented. Firstly, raising awareness about onconephrology among healthcare providers, patients and the public is crucial. This could be achieved by educating providers and trainees about the unique needs of this population and the value provided by onconephrologists, and larger cancer institutes should strive to initiate a multidisciplinary team that includes onconephrologists. Additionally, scientific societies play a crucial role in enhancing knowledge and facilitating the exchange of experiences among healthcare professionals from various specialties. While organizations like the American Society of Nephrology (ASN) and American Society of Onconephrology [4] advocate for onconephrology, leading the efforts of increasing time allocated to this field during their annual congress, other organizations such as the European Renal Association and the International Society of Nephrology are starting to focus efforts and time to this field in nephrology.

Secondly, collaboration between onconephrologists and national nephrology societies, such as the ASN, can contribute to the development of recognized career tracks in onconephrology. This could involve establishing an Accreditation Council for Graduate Medical Education (ACGME) and/or American Board of Internal Medicine–approved training pathways that focus on the unique needs of patients with cancer and kidney disease. Allocating resources to this effort may require support from healthcare institutions, funding bodies and professional organizations.

Lastly, increasing exposure to onconephrology in nephrology training programs may attract trainees and advanced practitioners. Incorporating onconephrology in the existing nephrology fellowship curriculum, in a manner similar to transplant nephrology, is going to be vital. Regular interdisciplinary meetings with oncologists, hematologists and nephrologists can facilitate discussions related to onconephrology education, curriculum development and collaboration opportunities.

The Future of Nephrology Task Force by the ASN recommends establishing individualized pathways to foster interest in the field, with onconephrology being a key highlighted subspecialty [5]. One

Table 1: Challenges facing the field of onconeurology and potential solutions.

Challenges in onconeurology	Proposed solutions
Decline in nephrology workforce	<ul style="list-style-type: none"> • Educating providers and patients about the unique needs of patients with cancer and kidney disease • Creation of multidisciplinary cancer care teams that include onconeurologists • Partnership with nephrology professional societies to develop a career track in onconeurology • Expanding onconeurology exposure in general nephrology training programs
Limited research resources	<ul style="list-style-type: none"> • Partnership between onconeurology professional societies and hematologic or oncologic professional societies • Increasing partnership with pharmaceutical companies • Developing new and improved diagnostic tools
Fragmented clinical guidelines	<ul style="list-style-type: none"> • Early involvement of nephrologists in a multidisciplinary team • Development and use of onconeurology-specific tools (such as OLIC) to support diagnosis and management decisions • Development of a protocolized position statement to unify current guidelines and define best practice recommendations
Lack of structured continued medical education	<ul style="list-style-type: none"> • Inclusion of onconeurology topics as core curriculum for nephrology training • Expansion of onconeurology as an advanced fellowship when feasible • Cross-disciplinary training and longitudinal commitment

possible approach is to offer onconeurology as a specialized track within an existing nephrology fellowship curriculum [6]. This would enhance proficiency and potentially lead to future ACGME support in providing comprehensive training in all nephrology domains. Integrating this track would require leveraging resources to foster interdisciplinary collaboration and optimize educational opportunities. However, practical challenges exist, such as securing funds for training and recruiting onconeurologists, as well as limited availability and accessibility of specialized training programs outside the USA. Initiatives like the Glomerular Disease Trial and Study Consortium (GlomCon) in the field of onconeurology can increase worldwide access to knowledge and expertise in areas with limited availability.

The second challenge highlights the limitation of research resources. Funding, research support and data-sharing provisions are necessary to advance onconeurology. Adequate economic resources are indispensable for expanding our understanding of kidney care in cancer; however, the scarcity of evidence in this patient population is due to the underrepresentation of onconeurology patients in clinical nephrology trials. As the prevalence of cancer and kidney diseases rises, allocating more resources from pharmaceutical companies and healthcare institutions to support research in this area becomes imperative. Realistically, securing research funding can be competitive, and resource availability may vary across different institutions and regions worldwide.

Developing innovative diagnostic tools is critical in onconeurology. Researchers must focus on improving imaging techniques, blood tests and diagnostic tools such as biomarkers for kidney disease. With better tools, researchers can detect kidney disease in cancer patients earlier and improve outcomes. This could involve multi-center trials and prospective registries for biosample collection. Recently, key biomarkers for immune checkpoint inhibitor-associated acute kidney injury, such as soluble interleukin-2 receptor, C-reactive protein and urinary T-cell cytokines, have been elucidated [7], but larger-scale testing is needed. It is important to note that the universal deployment of new diagnostic tools may pose additional obstacles, requiring substantial investment in research and development, as well as validation studies to ensure reliability and clinical utility.

The third challenge involves fragmentation of clinical guidelines for onconeurology, leading to difficulties in preventing, detecting and managing kidney dysfunction in patients with cancer. Advances in cancer treatment have improved survival but also resulted in a significant burden of CKD. Clinical trials often exclude patients with kidney disease, limiting data on the downstream impact of breakthrough therapies. Assessing GFR accurately is challenging in cancer patients due to limitations of serum creatinine and potential medication interference with creatinine secretion [8]. The proposed use of an estimated GFR equation combining cystatin C and serum creatinine could provide a more accurate assessment of kidney function [9]. However, limitations of cystatin C and the lack of universal lab standardization should also be considered.

To address these challenges, several approaches can be implemented. First, early involvement of onconeurologists is critical in preventing and managing renal dysfunction, associated with significant morbidity, mortality and limited candidacy for advanced therapies. Additionally, a personalized approach to estimating kidney function in cancer patients may lead to better outcomes and fewer medication toxicities. Second, using more sensitive and universal classification systems such as the Kidney Disease: Improving Global Outcomes criteria instead of cancer-specific guidelines like the Common Terminology Criteria for Adverse Events can improve patient outcomes and inform clinical guidelines [10].

Third, initiatives like the Onconeurotoxin Library Collaboration (OLIC), comprising onconeurologists, pathologists and cancer pharmacists, can provide accessible information on drug dosing, dialysis prescriptions, and anticipated toxicities and their management. OLIC serves as a valuable resource for providers with limited onconeurology training, supporting diagnostic and management needs. Finally, position statements by oncologists and nephrologists can provide guidance on measuring kidney function in cancer patients, as well as managing drug dosing and toxicities. Such statements can help standardize care for patients with cancer and kidney disease. However, it is important to recognize that standardizing clinical guidelines and implementing universal classification systems may face challenges due to cancer type heterogeneity, treatment regimens and patient subpopulations.

The final challenge is the lack of structured continued medical education. The field of nephrology is considered intellectually demanding and clinically rigorous. With the rise of precision medicine, onconephrologists are expected to have increased knowledge. As new therapies are developed, nephrologists must understand their applications and kidney-specific implications. To stay updated, a structured onconephrology continued medical education program is essential. Nephrologists-in-training should be exposed to onconephrology in inpatient and outpatient rotations as part of the general nephrology core curriculum. Major cancer institutions should expand onconephrology training as an advanced track. Cross-disciplinary training equips nephrologists to care for this patient population. Regular communication and case-based interdisciplinary conferences between oncologists and nephrologists improve patient outcomes and acute kidney injury management. By fostering ongoing dialogue and shared perspectives, a deeper understanding of the interplay between cancer and kidney disease can be achieved.

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CONFLICT OF INTEREST STATEMENT

P.E.H. is the creator of the Onconephrotoxin Library Collaboration (OLIC), and the Website Committee Chair at the American Society of Onconephrology. S.G. reports research support from BTG International and GE Healthcare. She is a member of GlaxoSmithKline's Global Anemia Council, a consultant for Secretome and Proletariat therapeutics, and president emeritus and founder of the American Society of Onconephrology. K.D.J. is the cofounder and president emeritus of the American Society of Onconephrology. He reports consultancy agreements with Secretome, George Clinicals, PMV pharmaceuticals and Calliditas. K.D.J. serves as the USA co-national lead for the IgA Nephropathy trial—VISIONARY. K.D.J.

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