Translation of Evidence Into Clinical Practice

Evidence-based medicine (EBM) emerges from the belief that delivery of care to patients will be more effective and efficient if decisions are based, as much as possible, on unbiased robust evidence regarding prognosis, etiology, diagnosis, and therapy/prevention. Although acknowledging a degree of uncertainty in every clinical decision, EBM has always challenged practitioners to pursue evidence to reduce uncertainty as much as possible. Application of only the most rigorous evidence can minimize the uncertainly inherent in medical decisions. Acknowledging uncertainty is uncomfortable for many practitioners and consumers of medical care where absolute certainty has always been valued, rewarded, and even expected. In this context, those practitioners or patients who require certainty may view EBM as a failed framework precisely because a robust evaluation of the evidence finds many questions that are imperfectly or incompletely answered. Rather than a failure, EBM emphasizes that when the evidence is incomplete, any final decisions about clinical care should reflect the patient’s preferences and goals. A fresh look at the wide scope of evidence that might inform patients’ decisions, as in this issue of Advances in Chronic Kidney Disease, allows one to appreciate fully both the potential of best evidence to improve care and to recognize the limitations of this corpus of evidence when exploited to incentivize improvements in specific aspect of the delivery of care by the community.

When considering the promise and pitfalls of translating best evidence from clinical studies into the clinical practice of nephrology at the bedside, it is informative to begin with a case that exposes some of the challenges and contractions inherent in the EBM approach in a patient-centered care clinical environment.

Consider Ms. R, a 74-year-old woman with ESRD secondary to hypertension who receives in-center hemodialysis thrice weekly. Her recent Kt/V as a measure of dialysis adequacy is below the target value for the dialysis provider, and thus, an increase in her time on dialysis is ordered. In an effort to implement patient-centered care, Ms. R is informed of the order and she objects to an increase in her prescribed time on dialysis. In attempting to inform Ms. R regarding the implications of her care decision, her nephrologist indicates that the increased time is mandated by the “regulatory” authorities and that the evidence demonstrates that she will not do well with a shorter time on dialysis. Ms. R wishes to make the choice about her dialysis time; she wants to know how likely is it she will not do “well” and how this decision will impact her quality of life and health status. Although the clinician states that the ordered change is based on evidence, the patient remains to be convinced.

How does one effectively translate the “evidence” both to inform our recommendations and the patient’s decisions about their care? How does one best acknowledge uncertainty in the evidence without communicating a nihilistic view of evidence-driven decision making?

The central promise of EBM is that the application of the most robust evidence to health care decisions will result in better patient-centered outcomes for all patients and that this care will be both individualized and personal. These goals depend on the successful translation of evidence to individual patient care. There are many challenges and barriers to an evidence-based practice in nephrology. Often evidence is incomplete or entirely lacking. This has led investigators to explore alternative methodologies to provide insights into the impact of risk factors and treatments on clinical outcomes. The EBM practitioner acknowledges randomized controlled trial (RCT) or systematic reviews of RCTs as the least biased type of evidence. Even when considering the RCT or the systematic review, however, we must appreciate not only their power but also their limitations. Issues of importance to patients or to providers may simply not have been considered in the design of the trial and the identification and labeling of outcomes in clinical trials may be distorted by cognitive bias or expectation bias. A patient might legitimately ask if the conclusions from a particular RCT applies to them. Were their unique medical conditions and circumstances represented in the trial? Newer, more individualized trial designs such the n-of-1 trial formally attempt to bridge this translational chasm.

Where evidence from RCTs is incomplete, rigorously performed observational/epidemiologic studies have been used to fill in some of the knowledge gaps. Observational studies have played a prominent role in nephrology in informing both practice guidelines and quality metrics. In the case of Ms. R, mandated goals of therapy have largely been determined by evaluating outcomes as reported in large national databases, such as the United States Renal Data System or CMS’s CROWNweb. More recently, evidences arising from analysis of these large databases have been used to evaluate and incentivize clinical performance of practitioners and health-services providers.

In parallel, analyses of data collected as part of routine care by health care systems or institutions, e.g., the Veterans Administration Electronic Medical Record, Kaiser Healthcare EMR, and other administrative databases, have been exploited to evaluate the relationship of certain prognostic factors/risk factors with the subsequent development of outcomes, such as mortality or major morbidities. These same large databases, assembled as a consequence of routine medical care, have been used to compare the effectiveness of treatment options, and this is especially true in those situations where RCT evidence is lacking. Such comparative effectiveness studies might allow us to begin to understand the potential impact of choices of similar treatment on outcomes.
Conclusions drawn from observational studies must be recognized as exhibiting a higher degree of uncertainty than those based on RCT evidence. Observational studies are always subject to distortion of the truth due to unavoidable bias; biases in the manner in which patients are identified or selected for specific therapies, biases in exposure measurements, and biases in the recording of outcomes. Outcomes of true interest to patients and practitioners, namely patient-centered outcomes that measure attainment of good health and long life, are often challenging to measure. Such outcomes are typically not recorded routinely in administrative database. Thus, the health care community frequently must rely on surrogate outcomes, such as biomarkers from laboratory tests, to predict future events. Surrogate outcomes have the advantage of allowing one to identify associations between a test level and outcomes quickly and efficiently. They, however, do not allow one to conclude “causation” and, therefore, are not always ideal for informing changes in practice intended to improve patient-centered outcomes.

The final challenges in translating evidence into practice relate to the centrality of the patient in shared decision making about their care. We must reconcile when patient’s decisions differ from guideline recommendations, especially when the latter have resulted in mandates from payers and providers. This challenge can be met in part with the implementation of effective proved strategies to explain to patients the totality of the high quality evidence. All the uncertainties in the evidence must be honestly portrayed so that patients can make informed decisions about their care in a shared decision-making approach with their care provider. A major challenge of shared decision making in patient-centered care is translation of the evidence into terms that patients can understand so that they can evaluate their care options supported by the evidence against their priorities and predicaments. Multiple patient-specific tools are being developed to assist patients in weighing options and in determining the near and long-term trade-offs they might expect with their decisions.

This last challenge, namely reconciling patient wishes with provider expectations when they differ from the care dictated by guidelines and external mandates, has, to date, not been fully addressed. As providers, we are incentivized to meet certain external mandates and are rated according to how well we meet these quality mandates. Conflict can result when patient choices diverge from our expectations. Patients may be labeled as non-compliant or “difficult” patients, thus limiting their future options of care. An EBM-informed, patient-centered practice may be able to meet this last challenge if the evidence can be adequately explained to patients and if patient-reported measures become a more important component of the overall measure of provider performance.

Returning to the case of Ms. R, we can appreciate that if this practitioner could better understand the sources of Ms. R’s resistance to the change in her dialysis prescription through motivational interviewing and other techniques, and if the practitioner could carefully and in an unbiased manner teach Ms. R about the evidence behind the recommended change, that a forward path may be obtainable that respects both the evidence and the patient’s goals. An unbiased presentation of the evidence is dependent on understanding the validity, applicability, and limitations in the evidence.

The reports published in this issue of Advances in Chronic Kidney Disease build on the introduction of evidence-based nephrology published in the ACKD volume 19 (1) in 2012. The current issue explores study designs beyond the traditional RCT that may supplement RCT evidence to more fully inform an EBM practice and exposes both the power of these sources of evidence and their limitations. This issue of the ACKD begins with Molony’s examination of how cognitive bias influences routine medical decision making that, in turn, affects the databases that reflect this care and the results of epidemiologic studies using such databases, the clinical trials that are conducted in this care environment, and the translation of evidence into routine care in nephrology practice. This chapter considers how cognitive bias might distort the evidence that is derived from analysis of such databases or clinical trials. In the next chapter, Samuel and Bell explore the types of evidence that can be obtained from unique trial designs such as the “N-of-one” trial and how such evidence can be considered in the context of the corpus of evidence informed largely by results from RCTs and epidemiologic studies. Mani and Ginier next address systematic reviews, one of the pillars of an evidence-based nephrology practice. They provide an EBM construct for evaluating the validity of systematic reviews, thus, empowering the EBM practitioner to better employ the results of systematic reviews to the practice of nephrology. Samuels next considers a topic that bridges considerations of evidence arising from clinical trials and from epidemiologic studies. He evaluates the role of surrogate outcome measures and how these might distort our understanding of disease prognosis and treatment. In the final 3 chapters of this EBM issue, the authors turn to considerations of observational and epidemiologic studies, their power, and their limitations in informing an EBM nephrology practice. Raghunathan and colleagues provide a detailed evaluation of the epidemiologic technique of propensity scoring to address some of the inherent limitations or biases when exploiting data derived from routine clinical practice to inform best practice. Ferguson and Tangri take these considerations 1 step further by addressing more robust methods to develop risk models that recognize the limitations inherent in databases of nephrology clinical practice. They examine and describe several notable biases that are common in observation studies. In the last chapter, Diamond and Howard address the role of observations derived from the large databases on public policy in nephrology, the power, and the limitations of utilizing such databases in informing public policy. After consideration of these topics, it is hoped that the EBM-centered nephrologist will better appreciate the scope of evidence and how to effectively translate the evidence into a patient-centered practice.
In an evidence-based nephrology practice, robust evidence from all sources should inform best practice and provide patients and clinicians with “data” that correctly informs a patient’s wise choices about their health care options. This evidence can arise from clinical trials or from epidemiologic studies. In either case, clinicians and patients might not fully appreciate the limitations of the evidence or what the evidence can and cannot actually tell us. The power of the evidence to provide unbiased answers, and the uncertainty inherent in even the most rigorous evidence, must be recognized by the informed evidence-based practitioner. The end result of this greater appreciation of evidence will be more effective, safer, and more efficient care arising from a collaboration between the informed patient and practitioner.

Donald A. Molony, MD
Joshua Samuels, MD, MPH
Renal Diseases and Hypertension
University of Texas McGovern Medical School at Houston
Houston, TX

REFERENCES