

Evidence-based nephrology

N. Bacon MRCP, D. Sackett BA, BSc, MD, Msc

Nuffield Dept. of Medicine. University of Oxford. John Radcliffe Hospital. Centre for Evidence-Based Medicine. Oxford. England.

The term «evidence-based medicine» was coined in 1992 to open a new era in the evolution of the application of clinical epidemiology to clinical practice. The previous «critical appraisal» era had seen the creation and dissemination of a useful set of guides for rapidly determining whether a clinical articles conclusions were likely to be true and of potential clinical usefulness. However, our ability to apply the results of this critical appraisal to individual patients remained primitive. Two developments led to the transition to the EBM era. The first occurred when the continuing revolution in information processing and dissemination turned its attention to the vast, unreadable clinical literature. For the first time, it became possible for busy clinicians to search large bibliographic databases fast enough to find potentially useful evidence within the very brief blocks of time that they can set aside for reading. The second development was the evolution of quick clinical methods, such as the «Number needed to Treat» (NNT), for extrapolating group results from a clinical article to an individual patient.

It became increasingly clear that clinicians who wanted to practice scientific medicine had to bring together three distinct elements: their clinical expertise, the best available external evidence, and their patients values and expectations. As we began to understand «the science of the art of medicine» it became possible for us to define some precise ways of integrating critically appraised evidence with our own expertise and our patients expectations, and it was time to mark this advance with a new name.

Since that first usage in 1992, the words and ideas have spread rapidly and, improved though diverse application and healthy scepticism, have become a world-wide force, of which this translation is one manifestation. Others are the profusion of other texts in the area, the creation of a host of new evidence-based medical journals of secondary publication that report the 2% of the medical literature that is both sound and immediately applicable, and the proliferation of Internet sites where both evidence and education can be obtained. But it should be recalled that the underlying ideas are not new. Westerners can track them back to 19th

century Paris when clinicians began to reject authority and tradition as the bases for truth in medicine, and began to insist on empirical studies among patients.

Evidence-based medicine (EBM) is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. The practice of EBM means integrating individual clinical expertise with the best available external clinical evidence from systematic research. By individual clinical expertise, we mean the proficiency and judgement that individual clinicians acquire through clinical experience and clinical practise. By best available external clinical evidence, we mean clinically relevant research, often from the basic sciences of medicine, but especially from patient-centred clinical research into the accuracy and precision of diagnostic tests (including the clinical examination), the power of prognostic markers and the efficacy and safety of therapeutic, rehabilitative and preventive regimens.

In considering the validity of the external evidence on efficacy, it can be summarised into the following «levels»:

Level 1a. Evidence form at least one «All or None», high quality cohort study in which ALL patients died/failed with conventional therapy and some survived/succeeded with the new therapy (e. g., tuberculous meningitis); or in which many died/failed with conventional therapy and NONE died/failed with the new therapy.

Level 1b. Evidence from systematic reviews (including meta-analyses) of multiple randomised trials.

Level 1c. Evidence from at least one randomised control trial (RCT).

Level 2. Evidence from at least one high-quality study of non-randomised cohorts who did and did not receive the new therapy.

Level 3. Evidence from at least one high-quality case-control study.

Level 4. Evidence from at least one high-quality case-series.

Level 5. Opinions from experts without reference or access to any of the foregoing (e.g., argument from physiology, bench research or first principles).

Moreover, Clinical Recommendations about treatment can be graded on the basis of these levels of evidence:

Grade A Recommendations: Based on Level 1 (a, b, or c) evidence.

Grade B Recommendations: Based on Level 2 evidence.

Grade C Recommendations: Based on Level 3, 4 or 5 evidence.

Good doctors use both individual clinical expertise and the best available external evidence, and neither alone is enough. As indicated above when identifying the sources of such evidence EBM is not confined to randomised trials and meta-analyses. It involves tracking down the best external evidence with which to answer the clinical questions, but also being aware of the origin of this evidence.

EBM TOOLS

The methods available for the practice of EBM are not unique to the subject. Indeed they are merely a subset of the many methods available to the clinician seeking to solve a problem or to keep current in their field. However the increasing size of the medical literature means that one cannot employ all the tools and all the knowledge. The volume of medical literature is so great that for a physician to keep abreast of journals relevant to their practice they would need to read 19 articles a day, 365 days of the year. Hence if we are to optimise the time we spend on clinical-problem solving it is vital that we only use those tools which are shown to be effective and efficient.

THE NEED FOR EVIDENCE-BASED NEPHROLOGY

Yet if as nephrologists we have always based our clinical decisions on the best possible evidence, then why is there a need for a new terminology and indeed why the need for an edition of the journal dedicated to the subject? Firstly, new types of evidence are now being generated which, when we know and understand them, create frequent, major changes in the way that we care for our patients. Secondly, it is increasingly clear that although we need, and patients with renal disease would benefit from, this new evidence daily, we usually fail to get it. Third, and as a result of the former, both our up-to-date knowledge and our clinical performance deteriorate with time.

Fourth, trying to overcome this clinical entropy through traditional continuing medical education pro-

grams does not improve our clinical performance. Finally a different approach to clinical learning has been shown to keep its practitioners up to date.

ROLES FOR EBM

So what then is the role for evidence based medicine for the clinical nephrologist? Three areas of practice in which EBM can play a significant role are education, patient management and knowledge dissemination. In all three the practical application of EBM may enhance clinical practice. It is important to note that adopting an evidence based approach does not replace individual clinical expertise, but rather it gives such experience added value.

It is more important than ever before that the nephrologist maintains high quality, continuing medical education. Patients with renal disease have always been generally well informed. Empowered by self-help groups and the huge amount of medical knowledge now available on the internet («Medline» is freely available to anyone with internet access), the interested patient may well be aware of trial results and research pertinent to their disease before their nephrologist.

Using the tools of EBM provides both an entry and a filter to the ever increasing volume of available knowledge. The doctor practising EBM knows how to efficiently access new knowledge as well as how to assess its value according to the levels above. EBM provides a framework for ongoing and effective *self* medical education.

The second role for EBM, closely linked with education, is in patient management. It is obvious that only those nephrologists aware of a new therapy may consider utilising it in the care of their patients, but the practitioner of EBM may go further. Through the efficient and regular analysis of the medical literature they will have a greater chance of being aware of any new therapy. Also by assessing a publication with respect to the levels of evidence they will be able to make quality judgements of its value and applicability to their *specific* patient.

The third role for EBM is in the dissemination of knowledge, whether to fellow nephrologists, nursing staff, medical students or —most importantly— to patients and their families. The passing on of medical knowledge is a fundamental part of the art of medicine, thus it is of crucial importance that what is passed on is accurate and applicable. The knowledge gained from «years of experience» has an undeniable value, yet how much more valued it will

be by others when supported by the results from patient centred, clinical research. Whilst the nephrologist may know what the *feels* to be the optimal means of managing fluid overload in the patient with the nephrotic syndrome, evidence of the value of the preferred management in large numbers of patients, can only serve to reinforce the value of their teaching to students, the confidence felt in them by medical and nursing colleagues, and the strength of their advice to patients.

SPECIFIC PROBLEMS IN NEPHROLOGY

Whilst the majority of a nephrologist's practice consists of common problems, there are a large number of less commonly seen diseases for which good evidence of treatment benefits is less easily found. Some would suggest this as a reason why EBM is not suitable for much of this field of medicine. However the reverse is more likely to be true. By definition a renal disease that is unusual will be relatively infrequently seen—even by the busiest nephrologist. In such cases «bedside experience» alone is unlikely

to be optimal in managing the patient. Only by pooling all the patients nationally or internationally might one hope to get a true picture of the disease and its best management. The recent increase in the number of nationally (and internationally) co-ordinated studies into such renal diseases is encouraging in the respect. It is hoped that this will lead to an increase in those conditions and treatments for which there is «Grade A» evidence.

Secondly one must consider the specific financial implications of evidence based nephrology. A number of physicians have expressed concerns that EBM might be used by those with responsibility for hospital budgets to restrict clinical independence. In many healthcare environments delivery of renal care accounts for a significant proportion of expenditure and thus it is natural for those in charge of budgets to have a keen interest in reducing the costs associated with renal medicine. EBM can facilitate shared consideration of the costs and benefits at the level of the individual patient and in the wider community. In this way «evidence based health economics» may be an especially useful tool to the nephrologist working within financial restrictions.