

Evidence Based Surgery: How Difficult is the Implication in Routine Practice?

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Abstract

Surgery as a discipline has perhaps been slower than other specialties to embrace evidence based principles. Today, surgeons all over Asia are prepared to challenge the dogma of yesterday. Surgical science which rests on a strong foundation of laboratory and clinical research can now be broadened to include the armamentarium of evidence based practice to advance surgical knowledge. The sheer volume of easily accessed information creates a new challenge. This article discusses keeping up with new information and finding the best available answers to specific questions amidst all the other information.

Keywords: Evidence based surgical practice; Clinical application; Statistics.

Introduction

Surgeons are increasingly required to use both the best available evidence and their expertise in clinical decision making. With the growing number of published research papers, finding this evidence is not always straightforward and without a proper search technique, it can be very time consuming. This is especially true not only for faculty members but also for residents in training. Once the surgeon has located the evidence, the study methodology needs to be appraised to determine whether it contains any weaknesses that could bias the reported results. Having established the robustness of the evidence, the surgeon then needs to decide whether the evidence will help to provide patient care.

Access to information - yesterday, today and tomorrow

Until recently, clinicians have needed to depend on colleagues and printed textbooks for accessing clinical information. These resources may be both familiar and convenient, but often provide limited information without explicit evidence-basis.^{1,2} In fast moving fields, books may be out of date even at the time of printing and become progressively more so.

Colleagues and consultants may not be available just when they are needed and may have hidden biases. Reading several journals is time consuming and may offer only a limited sample of

new developments. Information is relatively easy to come by in the electronic age. In principle, nearly all of the world's information is available instantly. The opportunities are almost limitless. Clinicians who want to keep up with the medical literature and look up the best information must invest time in developing their electronic capabilities and finding print publications that cull and synthesize the best evidence.

“Knowledge management”

The sheer volume of easily accessed information creates a new challenge: keeping up with new information and finding the best available answers to specific questions amidst all the other information. I personally feel “Knowledge management” is the term for effective and efficient ways of finding and organizing the best available information. Qualities of useful information sources for clinicians include:

- Easy access
- Specific: Targeted to the specific clinical question
- Recent: Current research information
- Transferable: As many clinicians move from (Out Patient Departments) OPDs to wards
- Implementable.

Some sources meeting many of these criteria include:

The Cochrane Database: This is a collection of systematic reviews of the effectiveness of clinical interventions, each including the articles that meet methodological criteria, a meta-analysis of their results, and a commentary. This database is slowly setting the standards in most clinical schools and practice.

Scholars from all over the world search the world's literature, in English and other languages, not just by Medline but also by hand, to find the best articles about specific therapeutic questions. Abstracts of these reviews are made available on the Web at www.cochrane.org and complete reports are available by subscription.

- **Clinical Evidence:** Clinical evidence (www.clinicalevidence.com), sponsored by the British Medical Journal, is a compendium of rigorous systematic reviews of evidence bearing on the effectiveness of clinical interventions, and outcomes that matter to patients. It is available to online subscribers.
- **Clinical practice guidelines:** At their best, guidelines are comprehensive syntheses of the best available evidence, from which the guidelines themselves follow. Guidelines may be out

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of date,³ so confirm their last revision dates. An effort is being made to establish a comprehensive database of all existing guidelines, which can be found at www.guideline.gov.

- ♦ **Systematic reviews:** These kinds of reviews are best for answering single questions (e.g., the effectiveness of preoperative biliary drainage in periampullary carcinoma). They are more scientifically structured than traditional reviews, making explicit how the authors attempted to find all relevant articles, judge the scientific quality of each study, and weigh evidence from multiple studies with conflicting results. They pay particular attention to including all strong research, whether or not it has been published, to avoid publication bias whereby positive studies are more likely to be published.
- ♦ **Meta-analyses:** In statistics, a **meta-analysis** combines the results of several studies that address a set of related research hypotheses. In its simplest form, this is normally by identification of a common measure of effect size, for which a weighted average might be the output of a meta-analyses. Here the weighting might be related to sample sizes within the individual studies. More generally there are other differences between the studies that need to be allowed for, but the general aim of a meta-analysis is to more powerfully estimate the true “effect size” as opposed to a smaller “effect size” derived in a single study under a given single set of assumptions and conditions. Some databases, such as the Cochrane Database, include cumulative meta-analyses in which the summary measure of effect is updated every time new study results become available.⁴
- ♦ **Medline:** Searching Medline is especially useful for rare events such as case reports or uncommon drug side effects or interactions. This approach is cumbersome for day-to-day questions because searches typically turn up many articles that are not strong enough to be clinically useful and because electronic searches miss many relevant articles. Searching can be made more sensitive and specific by using specific strategies.^{5,6} Searching is now free and relatively easy to accomplish by anyone who is connected to the Internet (PubMed at www.ncbi.nlm.nih.gov/sites/entrez; or Grateful Med at the same address).
- ♦ **ACP Journal Club:** online is a web-based compendium of abstracts reviewed in ACP Journal Club and is easily searched. (www.acpjc.org).
- ♦ **Books:** Printed textbooks are familiar, easy-to-use sources of information, especially for issues where the information base is not changing rapidly (e.g., diagnosis of appendicitis). However, even newly published textbooks are several months out of date when they are first published.
- ♦ **Journal reviews:** Reviews published in journals are relatively current at the time of publication; a typical time lag between acceptance and publication is six months. Disadvantages are that reviews tend to lag behind the best research evidence at the time they are written,⁷ and may reflect the biases of the author(s) while not making those biases explicit.

- ♦ **Websites:** The World Wide Web includes credible, up-to-date sources of medical information in fast-moving fields. Some especially useful sites are: Health advice for international travelers: www.cdc.gov; National Guideline Clearing house: www.guideline.gov; Patient Support Organizations: healthhotlines.nlm.nih.gov/subserch.html.

Getting the maximum benefit of minimum time

There are many opportunities to learn critical reading skills from books,⁸⁻¹¹ journal articles, courses, and special sessions of professional meetings. Full critical appraisal, one article at a time, is time-consuming and not feasible for most practicing clinicians most of the time. A variety of short-cuts, of varying effectiveness, are used to delegate critical appraisal, such as relying on a respected journal or trusted colleague.

Readers should understand that these proxies are far from perfect. Critical appraisal skills, short of full, independent reviews, can be useful in day-to-day information management. These skills help clinicians make wiser choices of information sources - for example, by looking at what they cite as evidence and how they weigh evidence from conflicting studies. These skills can also make informal reading more efficient by making it easier to concentrate on especially strong articles and to skip past weak ones.

Evidence Based Medicine (EBM): The Pyramidal Model of “Sackett”

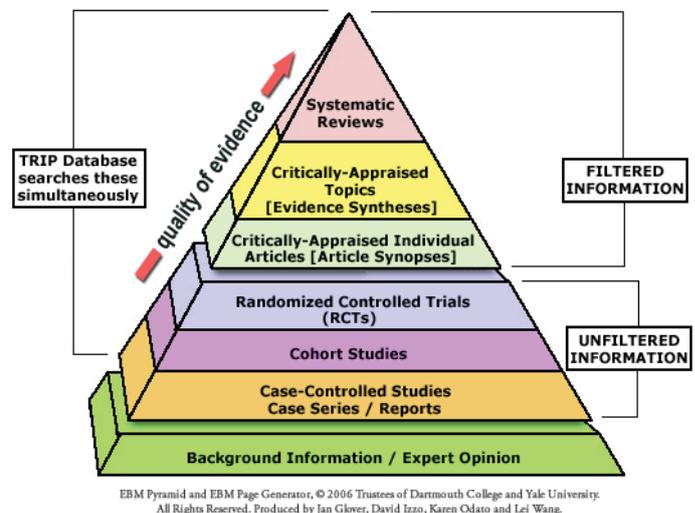


Figure 1: EBM pyramid and EBM page generator

Based on Sackett et al. the pyramidal model for evidence based medicine, systematic reviews are at the top on the level of evidence; with expert opinions/background information on the bottom of the pyramid.¹² Each level of the pyramid has its own importance. Even though expert opinion papers are at the bottom of the pyramid, in some topics within surgical practice, where randomized controlled trials are not possible, expert opinions still hold their due place.

The hierarchy then increases from “expert opinion papers, to case/series, to case-controlled studies, to cohort studies, to randomized controlled trials (RCTs), to article synopses, to evidence synthesis and finally systematic reviews.”¹² Surgeons and

especially residents in training should keep the pyramid in mind when starting their search on answering a clinical or research question or when reviewing a piece of evidence to see where it falls on the quality of evidence pyramid.¹³

Open access

For researchers, clinicians and surgeons in developing countries, getting access to some of these resources can be problematic given the expense associated with the subscriptions.¹³ Open access journals and associated publishers build on the philosophy that information should be made available free to all researchers around the world. Medline too has a separate database which lists all the open access resources (PubMedCentral) and people with limited access can start their search on the database of open access journals (<http://www.pubmedcentral.com>), where all the articles are available for free; and then move to other resources if subscription costs permit.¹⁴

Application in Clinical Practice

There are three complementary techniques for surgical decision making i.e. (a) acquiring knowledge and applying it to a clinical problem; (b) Integration of evidence; (c) Inference and Experience.

Studies of the care of patients in many settings have consistently shown a gap between the recommendations of experts, based upon the best available evidence, and actual practice. Reasons include a genuine concern about applying the results of large studies to individual patients, misunderstanding of the evidence itself, not being aware of the research results, and failure to organize care in a way that fosters use of evidence.¹⁵ The aim is to tailor research results to individual patients. To come closer to an estimate of what research results would be for an individual patient, it may be possible to find the answer in subgroups of the study patients, defined by such characteristics as age, sex, severity of disease, and presence of risk factors. Evidence-based medicine is not intended to replace clinical judgment.¹⁶

Each individual patient will be cared for with the best research evidence as a benchmark, but with care tailored to their individual circumstances - genetic makeup, past and concurrent illnesses, health-related behaviors, and personal preferences.

Evidence Based Surgical Practice: Is It Avoidable?

Change is hard; and changing a professional's practice is still harder. The transition of knowledge to practice has been based on a profession's culture. The resistance to change is enormous. A substantial body of research, as well as practical experience, has demonstrated that all of us, as we care for patients, engage in systematic errors of omission or commission, relative to the best available research evidence. Prominent examples are the widespread prescription of antibiotics for acute cough, or the use of radiologic tests for uncomplicated acute low back pain. In some cases, failure to practice according to the best current evidence is out of ignorance. But knowledge alone rarely changes behavior. Usually, no single influence is strong enough to make important changes; combinations are necessary. In general, changing clinical

behavior requires not just information, but also time set aside for rethinking practice habits.

Conclusion

What is required from the surgical community to implement evidence based practice and a concept of continuous quality improvement, apart from knowledge management, is the discipline for cultural change. In the present era, evidence based practice is inevitable. The paradigm is shifting to patient centered outcomes. This surgeon-patient shared decision making is the demand of today and is integral to future surgical care.

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