



## How to dissect surgical journals: XVI – The way forward\*

*Learning is the gate, not the house. When you see the gate, don't think it is the house. You have to go through the gate to the house, which is behind it. Since learning is a gate, when you read books, don't think this is the Way. This misconception has made people lose sight of the Way, no matter how hard they may study.*

Yagyū Munenori (1571–1644)

As readers, we focus onto the clinical 'bottom line' and fail to ponder the limitations of studies. This side of our nature regards critical evaluation as being negative. But there is a world of difference between a cynic and a sceptical empiricist. Cynics dissect to kill. Critical evaluation should enable you to move forward in a productive manner. It is the gateway to a rich store of professional knowledge.

The enemies of truth are bias, chance and dishonesty. They waste our time and lead us astray. Critical evaluation is about learning to recognize these enemies or, if we cannot make a positive identification, to suspect their presence.

### Develop an information plan

The discretionary nature of surgical practice requires a theoretical base. Bits of information that help to guide our actions are woven into a story that lasts until something better comes along. And it always does, but core knowledge has a long half-life; and fortunately, the amount of useful information is limited. You can survive quite adequately on a diet of review articles, carefully selected original articles and an appreciation of the prevailing opinions. It is the background noise that we have to identify and ignore. I suspect that more patients are harmed because their surgeon has read the latest journal than are harmed because their surgeon has failed to read the latest journal. As Philip Stanhope (1694–1773), the 4th Earl of Chesterfield, commented: 'The chapter of knowledge is very short, but the chapter of accidents is very long'.

Safe practice is about common sense and good judgement. It is not, as some 'evidence-based doctors' proclaim, heavily dependent on being up to date with the latest information. That is why overtly theoretical approaches to information, especially by non-surgeons, tend to grate. It is the mental equivalent of painting by numbers. It ignores the context. Also, just browsing a few journals and reading selected chunks of text is hardly an effective knowledge management process. Seize control and focus onto topics, not articles. The starting point is a question relevant to your surgical practice.

\*The 16 articles in this series are being made available on ANZJSurg.com as an eBook.

### The components of an information plan

- Frame the question
- Search the literature
- Filter articles
- Store information
- Use the information.

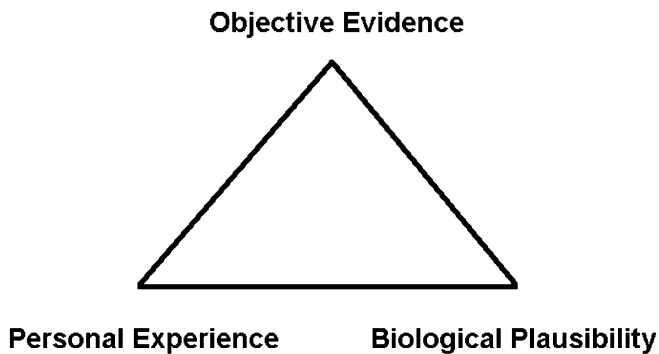
The PICO format identifies the most important components of clinical questions, that is, patient, intervention, comparison and outcome. These are useful starting points, but remember that there is a need to refine your search as you go along in the light of the interim results – searching the literature is an iterative process.

Articles from the credible surgical journals are indexed in PubMed. By all means, experiment with different search techniques, but I suggest that you keep it simple because many articles are incorrectly classified by subheading. Just play around with a few simple terms and filters and be prepared to scroll through the excess information. The Cochrane Collaboration is a database of systematic reviews that includes many useful accounts of interventions (<http://www.cochrane.org>). Other sources play a secondary role. Embase (<http://www.embase.com>) has a better European coverage, but is more focused towards pharmacology and other biomedical specialties. Google Scholar takes a different approach with access to technical reports and theses.

Do not forget to occasionally look back. Browsing through archives – be they old journals or old books – enables us to appreciate the fragility of our current beliefs, which will someday be regarded as 'the dead hand of the past'.

### Rely on search, not sort

It is very tempting to keep everything that may be of future interest. But it takes time and chews up storage space. What it does is present numerous opportunities for futile displacement activity – give them all numbers, catalogue the files, rearrange bookshelves, etc. I only keep summary notes with web links and reference lists in digital format. Admittedly, over time, there are some articles that have to be retrieved several times, but this is a small price to pay for a lack of clutter. As search engines improve, it becomes less important to store prime source material. But regardless of how you store information, there is nothing worse than being unable to find an interesting article that you once read – it is like having an itch that you cannot scratch.



**Fig. 1.** The triangulation of new information.

### Filter ruthlessly

Developing skills in critical evaluation will enable you to dissect away the useless flab that constricts and smothers the surgical literature. Once the repetitious and the irrelevant have been removed, much of what is left is invalid or too preliminary. Two-thirds of the surgical literature takes the form of narratives, anecdotes and pseudoscientific papers. Only one-third of the surgical literature relates to clinical investigations that are analytical in nature. Once review articles and clinical trials are split off for special attention, we are left with a residuum of original articles that are candidates for scanning and critical evaluation. Their recommendations must be approached with caution – as a group, they do not have the integrity of clinical trials and reviews, yet they often represent the new and the interesting.

Life is too short to spend time reading unhelpful articles. If the title attracts your attention, peruse the abstract and the final paragraph of the discussion. Or, if it is a topic that you are familiar with, head straight for the methods section. This is where you can best assess articles for credibility and integrity. Although the extent that you wish to filter information is a personal choice, consider rejecting:

- Articles that have no potential to alter your clinical practice (there is little point in reading articles that confirm your current practices)
- Retrospective studies (unless they deal with an unusual situation)
- Single-group studies (unless they deal with a rare event)
- Studies that lack an adequate control group
- Studies that do not involve large numbers of patients
- Studies where the observed difference between the groups are too small to influence your practice (regardless of the *P*-values).

This means that most of the surgical literature can be safely ignored. Yes, it is being ruthless – but your time is precious. The end result will be a small collection of articles that can be subjected to close scrutiny. I find it useful to triangulate new information (Fig. 1). Clinical experience and biological plausibility are useful, but not infallible, benchmarks.

### Evaluate evidence

The following are some promulgations about the appropriate content of clinical articles. They impinge on both methodological and

reporting standards. With time, these standards will mature and new collaborations will arise. The principles espoused within these documents have relevance to all forms of clinical research:

- CONSORT: The CONSolidated Standards Of Reporting Trials (<http://www.consort-statement.org>)
- STROBE: STrengthening the Reporting of OBServational Studies in Epidemiology (<http://www.strobe-statement.org>)
- STARD: STANDards for the Reporting of Diagnostic accuracy studies (<http://www.stard-statement.org>)
- SQUIRE: Standards for QUALity Improvement Reporting Excellence (<http://www.squire-statement.org>)
- PRISMA: Preferred Reporting Items for Systematic reviews and Meta-Analyses (<http://www.prisma-statement.org>).

An associated issue is the use of checklists for the evaluation of published research. There are two types of checklists – those promulgated by the respected authorities and those that you make up yourself. Both have merit. Making up, and applying, your own checklist is an excellent way of actively exploring the literature. Pick a topic, understand the theory and then apply it to a collection of papers. You will be surprised at how useful this is. Keep adding topics to your armamentarium and, with patience and diligence, you will develop a range of skills. Checklists become superfluous once you get into the swing of things – like scaffolding around a building, they can eventually be cast aside.

Unfortunately, many clinicians fail to link their actions with the available evidence. Many patients receive care that is either unnecessary or contrary to the prevailing evidence.<sup>1</sup> This highlights a fundamental flaw in the surgical literature. It spews out speculative prime source articles aimed at advancing knowledge in the future, while most surgeons want information that can be used to make better day-to-day clinical decisions.

The push towards evidence-based medicine – with clinical guidelines, deliberations of consensus groups and care protocols – is a response to concerns about standards of care. The Grading of Recommendations Assessment, Development and Evaluation system has been proposed as a uniform way of rating evidence and determining the strength of recommendations.<sup>2</sup> However, the authors comment that ‘There are limitations to formal grading of recommendations. Like the quality of evidence, the balance between desirable and undesirable effects reflects a continuum. Some arbitrariness will therefore be associated with placing particular recommendations in categories such as “strong” and “weak”. Most organisations producing guidelines have decided that the merits of an explicit grade of recommendation outweigh the disadvantages.’

The National Institute for Clinical Excellence in the United Kingdom is developing a series of national clinical guidelines (<http://www.nice.org.uk>). This is a valuable resource, but guidelines make a number of trade-offs in their quest for simplicity and clarity. They use specific concrete recommendations as an aid to compliance.<sup>3</sup> But they may be confounded by cultural differences. Haggard<sup>4</sup> has observed that: ‘the United States guidelines on otitis media with effusion (OME) do not recommend adenoidectomy

with first ventilation tube insertion (VTs), but a new United Kingdom guideline does . . . The difference reflects a judgment that in the United States it is much more important medico-legally to be seen to have avoided adding a more wayward operation at first VT insertion’.

### Evaluating guidelines

Who is the sponsor?

What is the specific aim?

Is it relevant for your patients?

Is it based on sound evidence?

What are the anticipated benefits?

Are the recommendations realistic?

Have validation studies been performed?

Does it work in practice?

Guidelines are not rules. They seek to aid, not replace, clinical judgement.

### Be aware of the games authors play

Authors play lots of games – some out of ignorance, others out of blind ambition. Unfortunately, you cannot take the competence and the intellectual honesty of authors for granted. Put yourself into the position of a desperate investigator. An apparently promising clinical study has turned out to be a dud. Being of the ‘publish or perish’ mentality generated by granting bodies and promotion committees, you need to find a way to boost the manuscript. There are a number of ways to do this – minimize the analytical component and include a review of the topic, rake over the results and turn the focus towards a secondary comparison that achieved ‘statistical significance’, perform a multivariable analysis of the risk factors or tack on an economic analysis. If all else fails, call it a pilot study and conclude by stressing the need for ‘a prospective randomized clinical trial’. In short, survival sometimes takes precedence over academic purity.

### Ten unforgivable sins:

- Failure to use an adequate sample size
- Failure to document the flow of patients
- Failure to use an adequate control group
- Overuse of *P*-values, that is, hunting with a shotgun
- Confusing *P*-values with clinical importance
- Equating correlation with causation
- Failure to validate predictions
- Artificially attempting to boost a ‘thin’ study
- Use of spurious references to generate authority
- Conclusions that go beyond the findings.

Some authors go to great lengths to hide a retrospective study. They will dress it up as ‘a single-institution retrospective cohort study’, ‘a nonrandomized historical study’, ‘the inception cohort were generated by’ or ‘our series using prospectively collected clinical and laboratory data’. Note that the latter merely states that the data were collected prospectively (how can you collect data retro-

spectively?). These distortions make it hard for the casual reader to appreciate that they are reading about a retrospective study.

Readers can also be misled by illustrations. The design features that are most at fault are broken scales, perspective views, use of logarithmic scales and excessive detailing (‘chart junk’). Editors and reviewers tend to gloss over the illustrations, so look at them carefully.

In the final analysis, it is the collective wisdom of surgeons that determine the worth of a study – the ‘web of users’. This may be markedly influenced by three factors: first, the soundness of the methods that were used in the study; second, the perceived integrity of the investigators; and, finally, the biological and clinical plausibility of the results.

### Live with ambiguity

We tend to dismiss evidence that challenges our beliefs. We are slow to change. That is why it is crucial that we remain sceptical of new ideas until the evidence is solid. In surgical practice, we refer to the same principle in risk management as ‘avoidance of early closure’. Applying premature diagnostic labels to patients is dangerous because we stop thinking about the options.

The ability to live with ambiguity is a survival skill

There are many tales about controversial therapies that failed to survive, such as nephropexy for ‘floating-kidney’, colectomy for epilepsy, gastric ‘freezing’ for peptic ulcer disease, internal mammary ligation for angina pectoris, bladder transection for detrusor instability and laparotomy for abdominal tuberculosis ‘to let the air in’. Egas Moniz, who invented cerebral angiography, was awarded the Nobel Prize in medicine and physiology in 1949 for ‘his invention of a surgical treatment for mental illness’.<sup>5</sup> His technique for frontal lobotomy was championed and simplified by Water Freeman in the USA. Both Freeman and frontal lobotomy generated controversy. Ken Kersey’s film *One Flew over the Cuckoo’s Nest* (1962) portrayed frontal lobotomy as a way of controlling nonconformists. This aspect of psychosurgery is an instructive case history. It may have been the best therapy at the time, but it now makes us feel uneasy. Could this type of thing happen again in another branch of surgery?

*Be not the first by whom the new is tried, nor the last to lay the old aside.*

Alexander Pope (1688–1744)

Our choices are not always logical. Ferguson<sup>6</sup> notes that people ‘miscalculate probabilities when confronted with simple financial choices’. He quotes a study by Kahneman and Tversky in which people were given the choice of a 50% chance of winning 1000 pounds or a 100% chance of winning 500 pounds, 87% chose the latter. The same group was then given the choice of a 50% chance of losing 1000 pounds or a 100% chance of losing 500 pounds, only

31% chose the latter. The two problems have identical pay-offs. Yet, the subjects were risk-averse when faced with gain but risk seeking when faced with loss. Do you behave like that?

The other side of the coin is that failures are an unavoidable companion of progress. New concepts arise and are evaluated by 'trial and error'. It is best if this is with the controlled environment of clinical investigation rather than the collective experience of individuals. But that is not always possible. For a short while, it was thought that early total pancreatectomy might avoid the poor outcome associated with severe pancreatitis. A few favourable case reports appeared, but it soon disappeared – surgeons tried it out, discussed it with their colleagues and came to the conclusion that it was futile.

### Putting pen to paper

Being invited to review a manuscript is an honour because it reflects your eminence in a particular aspect of surgery. While reviewing manuscripts has its own intrinsic rewards, it is an onerous task. Few papers qualify for an immediate unconditional acceptance. Reviewers are responsible for maintaining the integrity and confidentiality of the authors' work. It is important that reviewers adopt a positive and impartial attitude towards the manuscript under review, with the aim of enhancing the quality of the manuscript. Reviewers must disclose all relationships that could be viewed as presenting a potential conflict of interest. Conflicts of interest can occur because of financial relationships, personal relationships, academic competition and intellectual passion.

One approach is to start with a brief summary that covers the objectives of the manuscript, the type of study design, the potential overall contribution to either surgical practice or the basic surgical sciences, your impression of the main strengths and weaknesses of the manuscript, the author's interpretation of the data and the overall quality of the manuscript. The introductory paragraph should be followed by numbered comments that address specific issues (the numbering facilitates correspondence with the author).

### Epilogue

If you turned to this section without reading the rest of the book then you either have good scanning skills or the concentration span of a goldfish. There can be no simple summation of the issues. Critical evaluation is a state of mind applied to a process. It is the application of logic, aided by principles and rules that apply whenever you read an article about surgery. If you do this, after 20 years, you will have 20 years of experience, not one year's experience 20 times.

As the epigram at the start of this chapter indicates, critical evaluation is not an end within itself. The aim is not to transfix some dilettante with a penetrating question at a meeting. Nor is it the intellectual joy of understanding a difficult concept. It is also more than providing a colleague with a useful review of a manuscript. I have not tried to transform you into a *Homo Academicus* on a pilgrimage to a shrine of higher meaning. But the aim, rather, is to provide you with the tools to dissect out information that will enhance the way that you practice surgery. The development of these skills is asynchronous, irregular and incremental. Your progress will not be linear, but it should last until the day you cease to be a surgeon.

Just as a lack of technical skills is the Achilles heel of young surgeons, experienced surgeons can lack the strong theoretical base that is necessary to adapt to change. Look at the changes that have occurred in the last few years, then consider your future. Do you have the mental agility and flexibility to last the distance?

### Key points

- The safe practice of surgery requires a strong theoretical base.
- Don't waste time, be selective in what you read.
- Develop an information plan.
- Heed promulgated standards from authoritative groups.
- Embrace interactions with colleagues.
- Recognize critical evaluation as a survival skill.
- Learn to live with ambiguity.

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doi: 10.1111/j.1445-2197.2010.05650.x