

Another Time, Another Space: The Evolution of the Virtual Journal Club

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Virtual journal clubs (VJCs) provide a standardized, easily accessible forum for evidence-based discussion. The new virtual reality setting in which journal clubs and other online education events now take place offers great advantages and new opportunities for radiologists in academic medicine and private practice. VJCs continue to evolve, largely due to many emerging technologies and platforms. VJCs will continue to play an increasingly important role in medical education, interdisciplinary interaction, and multi-institutional collaboration. In this article, we discuss how to conduct and lead a critical review of medical literature in the setting of a virtual or traditional journal club. We discuss the current applications of VJCs in medical and graduate medical education and continued lifelong learning. We also explain the advantages and disadvantages of VJCs over traditional venues. Finally, the reader will be given the tools to successfully implement and run a VJC.

Key Words: Journal club; virtual learning; virtual journal club; education.

INTRODUCTION

The concept of the traditional journal club as a key component in medical education has been radically revised in the past decade in the advent of widely available Web 2.0 tools, ubiquitous access to social media, and increasingly mobile and affordable smart devices, which now enable “anytime, anywhere” access to learning and information (1). The new virtual reality setting in which journal clubs and other online education events now take place offers great advantages and new opportunities for radiologists in academic medicine and private practice. In this article, we undertake to summarize the applications of the journal club in the traditional sense and in its modern virtual existence, and offer specific steps and helpful information on how to set up and run an effective virtual journal club (VJC).

Research has shown that the quality of health care in the United States varies significantly among hospitals, cities, and states (2). Health systems are not widely successful in appropriate application of evidence-based medical practices, resulting

in errors, inefficiency, and reduced quality of life and longevity (3). In the specialty of radiology, many diagnostic imaging tests have not been sufficiently researched according to evidence-based medicine (EBM) criteria (4), with as little as 10% of imaging procedures having adequate evidence (4,5). Radiologic literature tends to lag behind advances in technology, the latter of which often outpace studies of clinical performance (4). Additionally, reviews of diagnostic methods in the literature, even in journals with a high impact factor, are sub-optimal (6,7). As such, teaching medical students and radiology residents how to retrieve, critically appraise, and apply results in the literature is paramount (8,9). Journal clubs provide an ideal setting for this essential component of medical education.

Because radiologists must keep abreast of literature and be able to incorporate it into patient care (10), the ability to critically assess the literature is essential for their successful practice. Understanding the validity of a study requires evaluating the process of patient selection, potential biases, adequacy of the reference standard, sample sizes, statistics, and reasoning behind resultant clinical recommendations (10). Before integrating the literature into daily practice, readers should question: Is it true? Is it relevant? Is it sufficient (6)?

EBM is as applicable to radiology as to other specialties. Its goal is to establish medical practices based on the best scientific evidence, including measures of safety, effectiveness, and cost (11). In the United States, EBM is considered the fourth revolution of health care, following the introduction of health insurance, backlash of payers to reduce costs, and outcomes-based research (11). Journal clubs can facilitate EBM by encouraging evidence-based learning (EBL). EBL consists of four critical elements: question development, literature search, relevant article selection, and critical appraisal (12). EBL ensures that individual clinical expertise is combined with the

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1. Ask an Answerable Question

- Formulate the question using P.I.C.O.
- P = Patient or group
- I = Intervention
- C = Comparison Intervention
- O = Outcome

2. Search for the Evidence

- Identify background knowledge gaps
- Utilize the Evidence Pyramid

3. Appraise

- Level of Evidence
- Materials/methods
- Results

4. Apply

- Use data to calculate LR / post-test probability

5. Evaluate

- Evaluate Results in Clinical Practice

Figure 1. Critical appraisal of medical literature.

best available clinical evidence, as neither factor is sufficient to provide proper patient care (13).

Medicine, in general, and radiology in particular, has shifted from being a vocation learned by memorization of facts to a lifelong process of active learning and analysis. EBM can help mitigate uncertainties in clinical medical decision-making (14), by providing evidence-based guidance for each facet of the patient care including the clinical history, physical examination, diagnostic tests, prognostic markers, and therapeutic interventions (15). Journal clubs help physicians examine the wide breadth of available literature, judge its validity, and apply it to a given clinical scenario (16). There has also been a recent push for evidence-based quality metrics that are often intimately tied to provider reimbursement and pay-for-performance models (11).

Learning to critically appraise medical literature early in one's medical career is of vital importance (17) (Fig 1). EBM can be taught using formal didactic lectures, journal clubs, and other less traditional active programs of professional development (17–19). Journal clubs have been shown to be effective in improving resident learning of the EBM process (20–22).

History and Evolution of Journal Clubs

Journal clubs originated in Germany and England in the late 19th century. The first known journal club in North America was established by Sir William Osler at McGill University, Montreal, in 1875 (23). The expansion of journal clubs in the United States soon followed, starting with Johns Hopkins Hospital in 1889. These weekly institution-wide meetings thrived for many years before less frequent, individual departmental journal clubs began to dominate (23). The earliest journal clubs were intended to minimize the cost of journal subscriptions by disseminating purchased materials to colleagues (24). In the 1960s, the focus of journal clubs shifted, becoming a forum for keeping up-to-date with the expand-

ing *corpus* of medical literature (25). Over time, journal clubs have become an integral part of medical learning, complementing the evolution of medicine from an apprenticeship, into a focused, supervised training and mentoring experience (26). With institutional subscriptions and greater availability of journal articles, the purpose of the modern journal club has evolved to include teaching and learning evidence-based medicine and critical appraisal of the literature.

Journal clubs allow for the creation of an alternative learning environment, complementary and distinct from the predominantly didactic form of education utilized in most medical schools. Journal clubs create an environment where the learners not only assimilate the information being presented, but interact with their peers, and often challenging the conclusions of the article being presented.

Journal clubs are now commonly used in medical schools, residency and fellowship programs, continuing medical education, and nursing education. These groups tend to have different approaches for successful journal club implementation, although they share some commonalities. The components of a successful and effective journal club include a designated, trained, and committed leader to choose the articles and facilitate the discussion; regular and anticipated meetings; literature aligned with clear, long- and short- term goals; appropriate meeting times and high attendance (mandatory or incentivized); formalized structure; circulation and review of materials prior to the meeting; continuing professional development; and use of internet for wider dissemination (21,27–30) (Fig 2).

Virtual Journal Club

A VJC is a venue allowing members to participate at their convenience, including how and when they want. Although the primary purpose of a VJC is as a more convenient form of the traditional journal clubs, multiple secondary

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