Twelve tips for presenting a clinical problem solving exercise

Gurpreet Dhaliwal & Bradley A. Sharpe

To cite this article: Gurpreet Dhaliwal & Bradley A. Sharpe (2009) Twelve tips for presenting a clinical problem solving exercise, Medical Teacher, 31:12, 1056-1059, DOI: 10.3109/01421590902912103

To link to this article: https://doi.org/10.3109/01421590902912103

Published online: 08 Dec 2009.

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Abstract

**Background:** Lectures are moderately effective for teaching medical knowledge but generally fail at promoting clinical reasoning. In a clinical problem solving (CPS) conference, a clinician is presented an unknown medical case in a stepwise fashion. These popular conferences highlight clinical reasoning and foster active learning to a greater degree than lecture-based education.

**Aim:** In the absence of literature which addresses the organization of these conferences, we present a guide for the teacher (case presenter) to maximize the session's educational value.

**Methods:** Practical issues for case selection, preparation, and presentation are addressed. The predominant theme is to retain an emphasis on real-time reasoning and to minimize the artificial nature of solving an unknown case from presented material rather than a live patient.

**Conclusions:** The successful execution of the CPS engages both the audience and the discussant in real-time problem solving and relies upon the tenants of experiential learning and clinical reasoning rather than the traditional structure of the medical case presentation.

Introduction

Over the last three decades, there has been a growing interest in the science and teaching of clinical reasoning (Norman 2005) – the process by which clinicians gather, analyze, and interpret information to arrive at a diagnosis and treatment plan. Demonstration of clinical reasoning is frequently cited as the most highly valued activity of a medical teacher (Irby 1992, 1994a; Smith et al. 2004). Coincident with decreasing attendance at lecture-based educational conferences (Mueller et al. 2003; Segovis et al. 2007), clinical problem solving (CPS) exercises – where an expert clinician is presented an unknown patient case in a stepwise fashion – are often among the most popular grand rounds and medical meeting sessions. CPS is distinguished from the clinicopathologic conference (CPC) where the discussant is provided the entire clinical course (absent the diagnosis) and asked to propose a final diagnosis after a complete discussion of the case.

During the CPS the experienced clinician displays the complex skill of clinical reasoning and harnesses the fundamental principles of adult learning theory (Newman & Peile 2002), including a sustained focus on a real-world problem, reactivating topics that learners have already encountered, and teaching information which can be applied in day-to-day clinical work. The main objectives of the CPS conference are for the discussant to highlight the intricacies of the diagnostic process and to teach medicine across a broad range of topics and for the audience to be actively engaged in solving the case throughout the presentation. The simultaneous engagement of the discussant and the audience in the diagnostic process is far more important than learning about the final diagnosis, which is a subordinate goal at best. We present a guide to the selection, preparation, and delivery of a CPS seminar to assist the presenter in maximizing the educational potential of these conferences.

**Tip 1: Picking the case**

The optimal case is challenging to solve prospectively but contains sufficient clues to make the diagnosis with a high degree of certainty in retrospect. A less common but familiar disorder (e.g., relapsing polychondritis) or a well-known disease presenting in a challenging way (e.g., deep venous thrombosis presenting as fever of unknown origin) will test the audience and discussant. Extremely rare diagnoses, never-before reported illnesses, or highly atypical presentations of common diseases (e.g., sarcoidosis presenting as an ingrown toenail) should be avoided. If the individual selecting and preparing the case has never heard of the diagnosis, it probably is not the right case.

Well-suited cases have multiple junctures where new information forces the clinician to revise and explain her working hypotheses. Such an evolving story which repeatedly draws on broad fundamental differential diagnoses (e.g., fever and rash, pancytopenia, arthritis) gives the discussant multiple opportunities to reason and teach and challenges the audience to reactivate and engage their own knowledge on multiple occasions.

**Tip 2: Use artistic license**

The order, pace, and timing of the clinical data presented at the conference will determine which differential diagnoses and
topics the discussant and the audience will explore. There is a balance to be achieved between including information which makes the case realistic and challenging and excluding details of day-to-day care that can be distracting and potentially unfair. If presented in the public setting (e.g., the fever on hospital days 6 and 7 which was caused by a catheter-associated urinary tract infection and had nothing to do with the final diagnosis of amyloidosis). By trying to recreate the thought process of the discussant and audience at every point in the case (e.g., “If I were the discussant, what would my differential diagnosis be now and what information would I want?”), the presenter can achieve the balance of maintaining necessary and appropriate clinical details (e.g., pertinent negative exam findings or normal laboratory studies, etc.) and at the same time recognizing what data might be extraneous or confusing.

Tip 3: Time management

CPS presentations can range from 20 to 60 min. In the allotted time period, the overall agenda is to present the case, provide adequate time for a meaningful discussion, and leave time for questions and concluding remarks. Allowing for typical introductions, start times, and discussions, the presenter should expect 2/3 of the allotted time to be the back-and-forth case discussion. A sample CPS presentation structure is shown in Table 1.

Tip 4: Avoid premature closure

Clinical information (e.g., “25 year old man with fever”) should not be included in the title slide (which is displayed before the conference begins) unless there is a specific goal of giving the audience and discussant prolonged time to consider the initial differential diagnosis. The title “clinical problem solving” and the identifying information of the discussant are sufficient. A clever title that hints at the diagnosis adds an element of creativity but premature closure by the discussant or the audience (e.g., cryoglobulinemia discerned from the title “a cool case”), may limit the scope of the discussion and diagnostic considerations. Likewise, the filename should not contain the diagnosis or any clinical information (e.g., “CPS TB case.ppt”), which the discussant may inadvertently see before the conference.

Tip 5: Start simple

Clinicians instinctively generate multiple hypotheses (differential diagnoses) when presented with early, limited clinical data (Barrows & Bennett 1972; Elstein et al. 1978; Kassirer & Gorry 1978; Barrows et al. 1982). In order to replicate this real life diagnostic process for the audience and discussant, the first case slide should contain a succinct identification sentence about the patient with a basic chief complaint and limited important demographic or clinical information. Limited information in the first slide allows the discussant to “warm up” and promotes a broad differential diagnosis. Consider how “25 year old man presents with fever” compared to “25 year old man with AIDS and history of PCP presents with fever and cough after returning from Cambodia” might lead to different opening remarks.

Tip 6: Present data as an “infusion”, not a “bolus”

Remembering and analyzing the specific details presented in multiple slides is a challenging task for a discussant in front of an audience. In general, a discussion break should follow every two to four slides of clinical data. Sometimes a single slide warrants discussion when pivotal information is provided (e.g., interpretation of the blood smear with intracellular parasites or the social history of nine birds at home).

Tip 7: Mind the gap

A blank slide will signal the presenter to stop speaking and will prompt the clinician to discuss the new data. Most importantly, the blank slide serves a buffer to prevent the inadvertent divulgence of subsequent information which may artificially compromise analysis of the previous section’s data. For example, the discussant’s interpretation of the neurologic exam will be undeniably influenced by hindsight bias (Dawson et al. 1988) if the presenter accidentally advances to the next slide with a ring-enhancing lesion on head CT. The blank slide is especially critical after the “a diagnostic test was performed/received” slide where the discussant is expected to render a final judgment before the diagnosis is revealed.

Tip 8: Keep the didactics short

A brief didactic at the end of the presentation can promote additional understanding of the case and the final diagnosis. However, the audience’s ability to learn more at the end of an entertaining and educational but cognitively demanding hour is limited. Three key points delivered in two or three slides at the conclusion are effective yet merciful. References can be provided for interested audience members.
Tip 9: Find a peer-reviewer

After developing in-depth familiarity with the case, it is easy for the presenter to underestimate its difficulty or shortcomings as it has been reconstructed. Review by an experienced clinician (or two) can avert errors in content, organization, and fairness before the public presentation.

Tip 10: Keep it real

Discussants often ask for additional details about the case during the presentation, such as the jugular venous pulse or skin examination. The presenter must maintain the real-time element of this exercise by answering such queries as they would in a court of law—just give the facts without any interpretation. “I don’t know” generally is the best response. Information should not be fabricated based on what the presenter expects it to have been. Most importantly, there should be no foreshadowing in responding to queries. The presenter must be steadfast in having the protocol resemble real-time reasoning, keeping the discussant and audience abreast of information as it unfolded for the clinicians who were taking care of the patient. If the discussant asks “did the patient have a blood smear?” and there was a blood smear but it occurs later in the course, answers such as “not yet” or “not at this point” signal that a blood smear is coming which will artificially modify the diagnostic reasoning. Just say “no”.

Tip 11: The post-script

After the diagnosis is revealed, the discussant should be invited to comment on the diagnosis and their thought processes. It is essential for the presenter to emphasize that the educational value of the exercise lies in the journey rather than the final destination, with the discussant being acknowledged for their teaching and reasoning regardless of reaching the correct or incorrect diagnosis. The remainder of the time can be devoted to the prepared succinct teaching points or a question and answer session. Inviting the comments of the treating physicians may add perspective and inspire a livelier conversation.

Tip 12: Increase interactivity

By its nature, the CPS is more engaging than the typical lecture, yet there are ways to increase the amount of dialogue and interaction between the presenter, the discussant, and the audience. For instance, students and residents or other audience members can receive an advance copy of the case protocol to analyze on their own or discuss during teaching rounds. A multispecialty panel of discussants (e.g., rheumatologist, infectious disease specialist, and oncologist) can be invited to discuss the case. This diffuses the emphasis and pressure on a single discussant, highlights the multidisciplinary collaboration commonly seen in complicated cases, and exposes the audience to multiple teaching approaches and specialty perspectives. Finally, an audience response system where questions are posed to the audience at multiple junctures during the case, essentially supplementing the discussant’s judgment with that of the audience, is a remarkably effective and enjoyable way to increase the interactive nature of these exercises (Latessa & Mouw 2005).

Conclusion

In the CPS format all parties—the presenter, discussant, and audience—are actively engaged in the learning process (Kassirer 1983). Case-based learning in the CPS incorporates core principles of adult learning theory (Peile 2006) by anchoring instruction in an individual patient, repeatedly challenging learners across multiple problems, and highlighting professional reasoning (Irby 1994b). The audience is exposed to the intermediate steps of the diagnostic process in a CPS exercise and embeds new knowledge in the context of a clinical case. Furthermore, the audience is relieved of the tedium that accompanies some lectures (Pauker 1970; Hurst 2004) by an interactive element which may range from intense internal dialogue (e.g., “what do I suspect the diagnosis is?”) to communal participation (e.g., audience response systems). These same elements may explain in part the ongoing popularity of CPS exercises in publications such as the New England Journal of Medicine, Neurology, and the Journal of Hospital Medicine.

While research shows that patient-centered conferences are valued by physicians (Stobo & Murphy 1989; Kassirer & Kopelman 1990; McLeod & Gold 1990), they are generally outnumbered (Mueller et al. 2006) by lecture-based grand rounds and medical conferences whose limited educational foundation and efficacy are well documented (Davis et al. 1992; Lewkonia & Murray 1995; Lewkonia et al. 1996). Since CPS conferences fulfill many educational tenants while potentially invigorating any educational conference series, we encourage their adoption and promotion in medical venues. Because of the high educational potential and great anticipation among both audience and the discussant, it is important for presenters to pay close attention to the selection, preparation, and delivery of the case.

Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

Notes on contributors

GURPREET DHALIWAL, MD is Internal Medicine Clerkship Site Director at the San Francisco Veterans Affairs Medical Center in San Francisco, California. He is an Assistant Professor of Medicine at the University of California San Francisco.

BRADLEY SHARPE, MD is an Associate Program Director for the Internal Medicine Residency and the Associate Division Chief of Hospital Medicine at the University of California San Francisco, where he is also an Associate Clinical Professor of Medicine.

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