

A Case Suspended in Time: The Educational Value of Case Reports

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Abstract

Although medical case reports have fallen out of favor in the era of the impact factor, there is a long tradition of using case reports for teaching and discovery. Some evidence indicates that writing case reports might improve medical students' critical thinking and writing skills and help prepare them for future scholarly work. From 2009 through 2015, students participating in the case reporting program at a VA hospital produced 250+ case reports, 35 abstracts, and 15 journal publications. Here, three medical students who published their case reports comment

on what they learned from the experience. On the basis of their comments, the authors propose five educational benefits of case reporting: observation and pattern recognition skills; hypothesis-generating skills; understanding of patient-centered care; rhetorical versatility; and use of the case report as a rapidly publishable "mini-thesis," which could fulfill MD thesis or scholarly concentration requirements. The authors discuss the concept of the case report as a "hybrid narrative" with simultaneous medical and humanistic significance, and its potential use to

teach students about their dual roles as engaged listeners and scientists. Finally, the authors consider the limitations and pitfalls of case reports, including patient confidentiality issues, overinterpretation, emphasis on the rare, and low initial publication rates. Case reports allow students to contribute to medical literature, learn useful scholarly skills, and participate in a tradition that links them with past generations of physicians. The authors conclude that the case report can be an effective teaching tool with a broad range of potential educational benefits.

The first known case report—on the diagnosis and treatment of jaw dislocation—was written circa 1600 B.C. on an Egyptian papyrus.¹ Since then, eminent physicians from Hippocrates and Galen to Osler and Freud have used case reports to communicate their clinical findings and educate their readers. Although case reports have perhaps lost some of their luster in the era of evidence-based medicine and the impact factor, there is an increasing groundswell of support for case reports and case series as "the first line of evidence."² Case reports play an important role in the discovery of new diseases and syndromes, unusual manifestations of disease, and adverse drug reactions, as well as in the generation of hypotheses for future study.^{3,4} For medical students and residents, the educational benefits of writing case reports can include improving writing and critical thinking skills, "collaborative writing" with

faculty mentors, gaining experience with the peer review process, and developing the skills necessary to produce scholarly publications.⁵⁻⁷ Here, using our own experiences as clerkship director (C.D.P.), students who have published case reports (R.B.K., C.L.I., and J.D.K.), and dean of health systems science (M.K.S.), we propose that case reporting can play a valuable role in medical education.

Over the past seven years, I (hereafter, "I" refers to C.D.P. except where noted) have required my third-year Department of Veterans Affairs hospital medicine clerkship students to write a case report on one of their patients. Early in each six-week rotation, I present a one-hour session on the evidence value of case reports, case selection, and the write-up, using examples of successful case reports written by past students. I stress the importance of a focused, concise report (at least 400 words and 2–3 references) that puts the case in context, offers a hypothesis to explain the clinical events, and makes a teaching point. At the end of the rotation, each student briefly presents his or her report to the group and responds to questions and comments.

I have given this assignment every year since 2009, and since then all of my students (5 per rotation, 40 per year, and

more than 250 in all) have completed it. Most have been able to work independently to identify a suitable case, research it, and produce a useful teaching point. Only students with unique or highly unusual cases are encouraged to attempt journal publication. To date, my students have produced more than 250 case reports; 35 have presented their reports as abstracts at American College of Physicians, Society of General Internal Medicine, and American Gastroenterological Association meetings, and 15 have published their reports in peer-reviewed general medicine, psychiatry, and pharmacology journals. For details on how to write and publish case reports, please see List 1.

Previous articles on the educational value of case reports⁵⁻⁷ have been written entirely from the standpoint of faculty mentors. To understand the student's perspective, I asked three former students to comment on how they chose and researched their cases, what they learned from the writing and revising process, and how the experience has affected their subsequent scholarly work. I selected these students because—having worked extensively with them on their case reports—I knew that they were highly motivated, eloquent, and given to self-reflection. Beyond the request

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List 1

Select Resources for Writing and Publishing Case Reports^a

- American College of Physicians. Writing a clinical vignette (case report) abstract. © 2016. https://www.acponline.org/education_recertification/education/program_directors/abstracts/prepare/clinvin_abs.htm.
- Gagnier JJ, Kienle G, Altman DG et al. The CARE guidelines: Consensus-based clinical case reporting guideline development. *J Med Case Rep.* 2013;7:223.
- Medical Education. Clinical case resources. Updated September 2013. <http://medicaleducation.wikifoundry.com/page/Clinical+Case+Resources>.
- Mookherjee S, Berger G. Case reports: A “how to” guide for attendings. *SGIM Forum.* 2015;38. http://www.sgim.org/File%20Library/SGIM/Resource%20Library/Forum/2015/SGIMJun2015_08.pdf.
- Rison RA. A guide to writing case reports for the *Journal of Medical Case Reports and Biomed Central Research Notes.* *J Med Case Rep.* 2013;7:239.

^aThe three Web sites were accessed on March 7, 2016.

for comment as framed above, I did not shape their responses in any way. These three students may not be representative of the group as a whole, but they highlight in their own words the positive outcomes that are possible when students write case reports. I discussed sharing the students’ comments with the Louis Stokes Cleveland VA Medical Center institutional review board (IRB), which declared this activity to be exempt from IRB review.

Student Narratives on the Case Reporting Process

Rachel Katz

When choosing a topic, I (R.B.K.) had to reflect on recent clinical cases and identify a clinical dilemma both novel and broadly relevant. Too common and the report would not be publishable; too specialty specific and it might be lost in an ocean of rarely cited literature. Given the required brevity of a case report, I had to write an illustrative, easy-to-follow story that included pertinent details of the patient’s presentation as it unfolded. To do so, I had to integrate creative and academic writing approaches while also including appropriate clinical information (e.g., differential diagnoses) and anticipating potential criticisms of the report’s arguments.

The multiple revisions of the report required me to aggressively eliminate all unnecessary information and to identify potential weaknesses of my arguments. I had to prepare myself emotionally to receive constructive criticism from my mentor and from journal editors. Through the guidance of my mentor, I learned skills in journal

selection to optimize both the likelihood of publication and journal relevance. I also developed a strategy for replying to editors’ comments.

This case report⁸ was my first publication in an academic journal. The excitement of acceptance and official publication fueled a fire for further academic writing. It strengthened my residency application and ability to connect with potential mentors. I also entered residency with greater expertise, relative to my peers, in the area of the neurologic effects of lithium toxicity. Since the report’s publication, I have received invitations both from major medical journals to review other articles on similar topics, and from conference organizers to discuss the case described in my report.

Corina Iacopetti

While selecting the case and researching the syndrome described in my report⁹ (i.e., cannabinoid hyperemesis syndrome), I (C.L.I.) learned to situate the patient in front of me—not only his history and test results but also his frustration, his suffering, his fear—in the larger context of what was then known about his condition. Delving into the literature enhanced my ability to critically analyze any gaps in the medical community’s awareness about a condition. Likewise, conducting this research encouraged me to search for patterns across the literature that might bridge some of these gaps, either by synthesizing existing knowledge or by using others’ findings to offer new hypotheses. Given the early stage of my medical training, mentorship during this work was crucial in helping me verify what constituted new or useful medical

information and whether my synthesis of the literature was appropriate.

In writing and revising the article, I developed an appreciation for the case report format and comfort with the writing style. I also gained valuable experience with the practical matters of publication. The process enhanced my ability to discern and select the details of a case that would be most relevant for an audience. This skill, in particular, has strengthened not only my subsequent writing but also my clinical work, teaching, and presentation style.

Although I understood, even at the time, how writing the article deepened my own learning, one later experience more meaningfully illustrated to me how case reports might be useful to readers. At one of my residency interviews, a program director shared with me that his residents had found our case report in a literature search and used it to help diagnose a similar patient, who is now doing well. It was at once humbling and thrilling to hear that the article may have played even a small role in helping connect a patient to care.

The experience has certainly sparked my interest in writing additional case reports and, more generally, in actively contributing to medical literature. Most significantly, it has underscored the importance of pausing to reflect on what I see every day in the hospital. The experience has reinforced the meaning of scientific inquiry motivated by a humanistic spirit: learning to probe a question more deeply and then to make findings accessible to a broader medical community—all in the hope of easing the illness experience for future patients.

Jeffrey Krimmel

Well before I (J.D.K.) even sat down to write my case report,¹⁰ the assignment influenced how I approached each of my patients. I was initially disconcerted that I might not encounter a patient who was sufficiently “interesting” for a case report. By the time I received the assignment, I had already completed six months of my third year of medical school without having felt inspired to explore a case further, so I wondered why should my luck change over the next six weeks?

My patients did not change, but my perspective did. When pressed to pay

closer attention, I soon realized that I could learn something from every patient, no matter how mundane (or even nonmedical) their problems. Thus, I first appreciated the value of writing a case report by reflecting on all of the patients I did not write about. As encouraged throughout this clerkship, I continue to try to ask myself, “What did I learn from this person?” after every patient discharge.

Through this project, I realized that the case report is a unique work in that it is accessible to every physician and every trainee. Unlike most other published works in the biomedical literature, it has modest startup demands. It requires no specialized equipment, no lab, no research budget, and no administration. All you need is a patient and an observation. At first, I conflated this accessibility with simplicity, but I soon realized that to make a truly insightful observation is decidedly nontrivial. While struggling with this, I better appreciated the words of British biologist P.B. Medawar¹¹: “Observation is not a passive imbibition of sensory information, a mere transcription of the evidence of the senses.... Observation is a critical and purposive process; there is a scientific reason for making one observation rather than another.” This captures how the case report process felt to me. Instead of feeling unambiguously inspired by one of my patients (as I had originally assumed case reports were born), I found myself carefully comparing aspects of several cases before choosing a subject. Even after narrowing to a particular case, the work of preparing an efficient presentation of the facts and a detailed but pertinent discussion was a rigorous and winding process. I would like to think that honing my skills of observation through the case report will benefit me both as a clinician and as a scientist.

Five Observed Educational Benefits of Case Reports

On the basis of these three students’ narratives, their case reports, and my seven-year experience directing the clerkship, I propose the following five educational benefits of case reporting.

Observation and pattern recognition skills

Every case report begins with an insightful observation. As noted above,

Krimmel “first appreciated the value of writing a case report by reflecting on all of the patients I did not write about” and by “carefully comparing aspects of several cases before choosing a subject.” Evidently, the very act of seeking a case to report can foster a habit of “critical and purposive”⁹ observation, which may lead to a broader and clearer diagnostic perspective. The difference between a profound case and a pedestrian one often hinges on new and subtle variations in presentation, natural history, or response to treatment. For example, Katz’s recognition of a transient transcortical motor aphasia in a lithium-toxic patient depended on the astute observation that the patient had halting speech and an inability to write but was able to repeat fluently.⁸ Bordage¹² describes how close observation and pattern recognition are essential elements of “elaborated knowledge,” whereby strong diagnosticians use semantic patterns and associations to organize their thinking. Recognition, exploration, and explanation of complex or unusual patterns is more than a key to discovery of reportable cases: It is fundamental to the process of diagnosis. Perhaps it follows that students who write case reports are learning to become better diagnosticians.

Hypothesis-generating skills

In their discussion of the desirability of speculation in medical writing, Skelton and Edwards¹³ conclude that “every paper must reach a conclusion that is not contained in its results.” Speculation—or, put another way, hypothesis generation—is critical in case reporting; without it, the case narrative stands alone, without interpretation or explanation. The three students profiled here developed plausible hypotheses to explain, respectively, transient transcortical motor aphasia in a lithium-toxic patient,⁸ serotonergic pathway involvement in cannabinoid hyperemesis syndrome,⁹ and possible mechanisms for type B lactic acidosis in a patient with a solid malignancy.¹⁰ All three students made multiple revisions to their discussions, refined their arguments in response to reviewers’ comments, and learned to anticipate criticisms of their hypotheses. Self-criticism, the ability “to identify potential weaknesses of my arguments” (Katz), is an important

skill for physicians and scientists that serves as a check to the sometimes-blind enthusiasm for a favored hypothesis.

Understanding of patient-centered care: The case report as a “hybrid narrative”

Case reports require students to attend carefully to the details—both medical and nonmedical—of individual patients, as illustrated by Iacopetti’s comment: “I learned to situate the patient in front of me—not only his history and test results but also his frustration, his suffering, his fear.” Patient-centered care promotes partnership, solidarity, empathy, and collaboration between physicians and patients.¹⁴ Case reports focus on individual patients, not populations, and they tend to emphasize individual variations in disease presentation, responses to treatment, and clinical outcomes. Additionally, they often include some discussion of patient values and preferences. For instance, those who read the profiled reports learn that the patient with type B lactic acidosis opted for hospice care after a family discussion¹⁰ and that the patient with cannabinoid hyperemesis syndrome was unwilling to quit using cannabis despite counseling.⁹ Case reports are thus fundamentally patient centered.

Rita Charon¹⁵ has described “narrative medicine” as “clinical practice fortified by narrative competence ... the capacity to recognize, absorb, metabolize, interpret, and be moved by stories of illness.” Although case reports are medical communications and can be highly technical, they are also stories of illness. As such, they are hybrid narratives, clinical–personal accounts with simultaneous medical and humanistic significance. While the students in the case writing program have been intrigued by the medical intricacies of their cases, they have also spoken frequently to me about the sufferings and strengths of their patients. The inescapably hybrid nature of the case report positions it as a perfect tool for teaching students about their dual roles as engaged listeners and scientists, first hearing the story and then searching for the explanation.

Writing skills and rhetorical versatility

The four classic rhetorical modes, which describe the major kinds of writing, are

narrative, descriptive, expository, and argumentative.¹⁶ The formal structure of a case report comprises the concise narrative description or “unfolding” (Katz) of the case, the summation of research findings, the argument in support of a hypothesis, and the explication of the context of the case—its place in the literature. These elements require skill in all four rhetorical modes. In the students’ words: “I had to write an illustrative, easy-to-follow story ... integrate creative and academic writing approaches” (Katz); “search for patterns across the literature ... synthesiz[e] existing knowledge ... offer new hypotheses” (Iacopetti). Furthermore, case reports demand quick shifts from one mode to the other, often on a paragraph-by-paragraph basis. Such rhetorical versatility is desirable in all forms of medical communication—from bedside case presentations to major research studies—in which authors must shift from narration and description to speculation and argumentation.

The case report as a “mini-thesis”

A thesis is a dissertation that embodies results of original research, substantiates a specific view, and contributes to the literature. In essence, a formal case report is a “mini-thesis,” comprising a novel or unusual event that requires an explanation, a well-supported hypothesis, and a discussion of its clinical importance. Iacopetti’s comments on her improved ability “to offer new hypotheses” and “to search for patterns” illustrate the importance of case reports for closing gaps in medical knowledge, stimulating new lines of thought, making unexpected connections, and suggesting new approaches to problems. Unlike the traditional thesis, a case report does not require years of concentrated work but, rather, can be prepared for publication in a few months. An increasing number of medical schools have thesis or “scholarly concentration” requirements,^{17,18} and I propose that an in-depth published case report could serve as an excellent alternative to bench or epidemiologic research to fulfill these requirements for clinically oriented students.

Limitations and Pitfalls of Case Reports in Medical Education

Along with the educational benefits described above, educators must also

consider the potential limitations and pitfalls of having learners write case reports.

Patient confidentiality

Despite the best efforts of authors, patient confidentiality in case reports cannot always be guaranteed.⁴ Educators must discuss the importance of patient consent and deidentification of patient data up front with students. Because patient confidentiality is central in all research endeavors and in every physician’s practice, I see the assigned case report as a great opportunity to teach students to consider, respect, and preserve confidentiality.

Overinterpretation and emphasis on the rare

Because they lack clinical experience, medical students are particularly prone to overinterpretation, a tendency to generalize when there is no justification for it. This is also known as the “anecdotal fallacy.”^{4,19} Overinterpretation of their cases could lead students to make false causal connections and diagnostic errors. In addition, there is concern that students who are preoccupied with rare and atypical cases might lose their perspective and order excessive testing or treatment. Again, preemptive discussion of these hazards can be helpful. I stress to my students that they must understand the common manifestations of the disease in question and the limits of anecdotal evidence before they begin their case reports.

Low initial publication rate

In my experience directing the clerkship, only 15 of the students (6%) have gone on to publish their case reports in journals. I have observed several reasons for the low publication rate: Students are unlikely to encounter a publishable case over a six-week clinical rotation; some who do find rare cases have been either too busy to write them up for publication, or unable to find a willing faculty mentor (14 of the 15 students who did publish required faculty mentors as coauthors). In any case, I think that the short-term publication rate is not the full measure of the effectiveness of this teaching tool. All students, even those who did not publish initially, learned basic case reporting skills and should be well prepared to write a case report in the future. I

plan to conduct a follow-up study of my students’ long-term publication rates to measure the durability of this intervention.

In Sum

Case reporting can have substantial educational benefits for medical students. Selecting and writing a case report can sharpen critical and observational skills, improve medical writing, strengthen the ability to generate and defend a hypothesis, and increase understanding of patient-centered care. It can give students valuable experience with the editorial process, motivate them to take a scholarly view of their clinical work, and allow them to contribute to the medical literature. Furthermore, through what Corina Iacopetti eloquently describes as “scientific inquiry motivated by a humanistic spirit,” case reporting tells stories of human suffering and transcendence, and links student authors with a historical tradition that goes back almost 4,000 years. The time has come for medical educators to take a fresh look at the case report; modest and old-fashioned as it seems, it can be an effective and multifaceted teaching tool.

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