

## NEW PERSPECTIVES

## Case Reports: Good Evidence, Good for Teaching

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**M**edical case reports are often dismissed as isolated and subjective clinical observations that are of little value in evidence-based medicine. This misperception—and the relatively low citation rate of case reports in the era of the impact factor—has led to their ouster from many influential journals. Consequently, both medical students and physicians tend to focus on “high quality” studies (i.e. prospective, randomized, placebo-controlled trials) and relegate case reports to the medical historians and fringe researchers who might appreciate their arcane interest.

Despite this, we continue to produce a steady stream of case reports. A quick look at PubMed reveals a total of 1.71 million published case reports, with about 50,000 published in 2013.

Does this represent an irresistible urge to publish the odd and unusual, or is there something more to it? I think that anyone who actually practices medicine understands the practical value of case reports. Clinical trials answer questions about populations of patients; case reports are about individual patients. How long does it take in the office, or on the wards, to find a patient whose illness raises questions that are not answered by prospective clinical trials? I once had an elderly patient with weight loss who was found to have prostate cancer and a PSA of 200. His metastatic work-up revealed multiple pulmonary nodules but no liver or bone metastases. I had never heard of prostate cancer metastatic only to the lungs and consulted a pulmonologist for a bronchoscopic biopsy. First, though, I sent my student to do a literature search, and he returned with several case reports of men with prostate cancer metastatic

only to the lungs who had complete regression of their lung nodules with hormonal treatment. Armed with this evidence, we decided to cancel the bronchoscopy and proceed with treatment.<sup>1</sup> This is one example of the clinical guidance we can get from case reports, especially for unusual or puzzling cases.

Randomized clinical trials may be the peak of the evidence “pyramid,” but case reports and case series comprise the foundation. In addition to helping with the treatment of unusual cases, case reports help us to discover rare drug side effects; report new diseases such as AIDS, which was first described in case reports of young homosexual men with Kaposi’s sarcoma; share unusual disease presentations, associations, or natural histories; and generate hypotheses that might be tested by randomized clinical trials. Osler knew the value of writing up cases: A look at his bibliography shows an incredible range and volume of reports. These include the first complete account of pernicious anemia; the natural histories of bacterial endocarditis, bicuspid aortic valve, thoracic aneurysms, Bright’s disease, malaria, tuberculosis, anthrax, syphilis, actinomycosis, smallpox, impacted gallstones, and brain tumors; and even veterinary medicine.<sup>2</sup> “Always note and record the unusual,” Osler said. “Publish it...place it on permanent record as a short, concise note...such communications are always of value.”

Why should medical students write formal case reports? After all, they are writing up every patient they admit on the wards. Why burden them with this additional exercise? As it turns out, a case report is very different from an admission history and physical. The aim of a case report is to elucidate one aspect of the

case with the greatest possible clarity and depth of understanding, to connect and compare it with similar past cases, to describe what is interesting or unique about the case, and to make a clinical teaching point. The skills required to write a good case report include the ability to frame a clinical question, to research the literature exhaustively and effectively, to put the findings in their proper context, to find connections and explain them with clear arguments, to make reasoned hypotheses, and to find the vein of clinical gold that is the teaching point. These cognitive skills—editorial, critical, speculative, synthetic, and imaginative—are of a higher order than the data collection and basic differential diagnostic thinking required for the H&P. They are also skills that every physician must develop because the complexities of patient care demand an understanding of the connections, contexts, and possibilities of each individual. Every patient we see, in effect, is a case report waiting to be written.

For the past six years, I have required my medicine clerkship students to write a formal case report on one of their patients. The result has been a treasure trove of almost 200 case reports, ranging from adverse drug reactions to rare infections to unusual presentations of disease and even ethical dilemmas. These are some of my favorites:

- Transient transcortical motor aphasia caused by lithium toxicity
- *Sphingomonas paucimobilis* bacteremia in a patient with alcoholic cirrhosis
- MSSA-associated metastatic endophthalmitis
- Left atrial invasion of squamous cell lung cancer

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- Diclofenac-associated neutropenia
- Pylephlebitis associated with necrotizing pancreatitis and prostatic abscesses
- *Pantoea agglomerans* bacteremia from a rose thorn injury
- Prostate cancer metastatic to the clivus, presenting as episodic diplopia
- Elephantiasis nostras verrucosa in a 62-year-old man with chronic lymphedema
- Occult *Citrobacter freundii* bacteremia in a man with cirrhosis
- Ipilimumab-induced pan-colitis
- Type B lactic acidosis caused by metastatic gastric carcinoma
- A case of Aagaenae Syndrome (lymphedema-cholestasis syndrome)
- Cannabinoid hyperemesis syndrome
- “Hot potato voice”: a case of airway compromise in infectious mononucleosis
- Cushing’s Syndrome due to an interaction between oral budesonide and ritonavir
- Concurrent reactive arthritis, Graves’ disease, and warm autoimmune hemolytic anemia
- Xanthogranulomatous pyelonephritis presenting as fever of unknown origin
- MERS (mild encephalitis with a reversible splenic lesion) in the setting of Legionella Pneumonia and B12 deficiency

More than 20 of these case reports have been presented as American College of Physicians or SGIM abstracts, 10 have been published in journals, and three or four describe

previously unreported adverse drug reactions or conditions that add importantly to the medical literature. Even more gratifying, though, has been the enthusiastic response of my students. The most interesting part of writing a case report is the quest for a hypothesis to explain the new and unexpected findings of the case, and this is where they have really excelled. One student searched both the clinical and basic science literature on lithium toxicity for months to come up with a plausible mechanism for lithium-induced transcortical motor aphasia.<sup>3</sup> Another took on the challenge of explaining the paradoxical pathophysiology of cannabinoid hyperemesis syndrome, and after an exhaustive literature review and much back-and-forth discussion, she produced several promising (and publishable) hypotheses.<sup>4</sup> A third plunged into the complex domain of polysulfone dialysis membranes and electron beam sterilization to explain her 91-year-old patient’s dialysis-associated thrombocytopenia.<sup>5</sup> One enterprising student not only described and named a new syndrome but also showed a surprising sense of humor in his title for the report: “SAME is Different: A Case Report and Literature Review of *Staphylococcus aureus* Metastatic Endophthalmitis.”<sup>6</sup>

Finally, co-authoring case reports with students provides an opportunity for extended mentoring that can go far beyond the confines of the clerkship. The protracted nature of the publication process, with its rejections, revisions, and new avenues of inquiry, allows for long-term coaching and teaching in a setting of mutual respect and discovery. At the same time, case reports give students an

opportunity to contribute in a small but permanent way to the foundations of evidence-based medicine. “Clinicians have the privilege of dealing with individuals in all their complexity and magnificence,” writes Richard Smith. “Every person, every ‘case’ can teach us something.”<sup>7</sup> This is the true lesson of case reporting, and I am happy to report that my students are beginning to learn it.

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