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Ambulatory training in neurology education☆

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ABSTRACT

Much of the care provided by practicing neurologists takes place in outpatient clinics. However, neurology trainees often have limited exposure to this setting. Adequate incorporation of outpatient care in neurology training is vital; however it is often hampered by numerous challenges. We detail a number of these challenges and suggest potential means for improvement.

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1. Introduction

The outpatient clinic serves as a substantial component of many neurologists' clinical activity upon completion of their training. This is not unique to neurology and can be seen across numerous medical specialties. Within neurology there are a number of subspecialties in which clinical experiences are heavily and some almost exclusively centered within the context of the outpatient clinic. Recent neurology residency graduates report a desire during their training for additional exposure to predominantly outpatient subspecialties such as neuromuscular and neuro-oncology as well as office- based procedures such as botulinum toxin injection [1]. Therefore the manner in which outpatient clinic experiences are incorporated into education is vitally important. The history of neurology education in the outpatient clinic has been well described, and in turn will not be covered in detail in this manuscript [2]. We will delineate the benefits and challenges of building up the outpatient learning experience for neurology trainees and present potential solutions for expanding the outpatient neurology training experience.

The context of the educational experience, as defined by not just the location but by the interaction of myriad factors germane to that experience, [3] is integral to both the knowledge and clinical skill gained and developed by the trainee. The outpatient clinic provides the trainee with a variety of factors unique to this educational and clinical care context. The Liaison Committee on Medical Education (LCME) mandates the utilization of the outpatient clinic as a site for medical student education across all disciplines, acknowledging its importance in the education of medical students [4]. A similarly explicit mandate for neurology residency programs by the Accreditation Council for Graduate Medical Education (ACGME) strengthens the importance of the outpatient clinic in the development of the trainee into an independent practitioner [5]. As the ACGME and the American Board of Psychiatry and Neurology (ABPN) move forward with the Neurology Training Milestone Project, many of the skills incorporated in the Milestone Project will be taught and learned in the outpatient clinic [6].

An aging population in many developed countries is associated with an increase in the number of individuals with chronic neurological disorders, such as neurodegenerative diseases. There is ongoing development of diagnostic and therapeutic modalities to address these diseases. The neurologist in the outpatient clinic will likely provide this clinical management.

2. Challenges

A number of potential challenges exist in the utilization of the outpatient clinic for neurological educational experiences. A predominant factor in the current academic environment is the notion that teaching leads to decreased efficiency, in turn leading to decreased clinical revenue for time spent. With increased focus on revenue generation there is the potential that the educational mission becomes secondary. A corollary of the time constraints is the potential limitations on autonomy and

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independent evaluation of patients by trainees. While supervision is necessary, incorrectly calibrating the degree of supervision may either be dangerous for patients, or push trainees into roles of passive receptivity in an exclusively shadowing experience. Additionally, if a larger proportion of time is devoted to outpatient clinics, less is available to cover inpatient clinical responsibilities. The growing role of inpatient neurohospitalists may be a means for lessening the inpatient responsibilities for neurology trainees. Some programs also utilize neurohospitalist-run discharge clinics which could prove to be fertile learning environments [7]. The final challenge is the difficulty finding time to provide informal teaching and constructive feedback between patient encounters. These challenges may contribute to residents' suboptimal perceptions of the outpatient educational experience. Only half of neurology residents report the teaching and supervision they receive in continuity clinic as excellent. This may be due to the lack of marked diversity in the patient population they report seeing there [8]. This deficit in the breadth of clinical conditions in resident clinics provides an opportunity to strengthen the outpatient educational experience for trainees.

3. Goals of the outpatient training experience

The goals of the educational experience in the outpatient neurology clinic vary by the level of training (medical student vs. resident vs. fellow). However, some common themes are relevant to the ambulatory educational experience of all trainees. First, it provides real-world experience functioning within a clinical context, team, and system in which many trainees will ultimately devote a substantial percentage of their clinical activity. This is likely of progressively greater importance the further the trainee is in their education, and as their career path becomes more differentiated. Second, it provides exposure to a range of cases which differ substantially from those routinely encountered in the inpatient setting. Cases regularly encountered in the neurology clinic vary between disorders with high incidence such as headache and low-back pain to uncommon subspecialty disorders. The care of commonly encountered disorders such as headache has grown progressively more complex and now includes therapeutic procedures performed in the outpatient clinic such as botulinum toxin injection, a skill which residents feel they have limited exposure to during training [1,9]. Case volume in the clinic has the potential to be much higher when compared to the inpatient setting. This allows for frequent repetition, a central element of learning [10]. Trainees can see a large number of patients with the same disease process and develop a longitudinal perspective of the disease's natural history by evaluating numerous individuals at different stages of the disease course, the variability in presentation, and variability in response to treatment across the human spectrum. This opportunity is particularly pronounced in subspecialty clinics where in a single day trainees can experience the entire range of clinical manifestations of a specific disease. When structuring the workflow of the outpatient clinic the role of trainees should be considered. While it is critical that the supervising physician dedicate some time to direct teaching of trainees, this need not reduce patient volume in the subspecialty clinics. If facility space and support staff allow it, the independent evaluation of patients by trainees (be they students, residents, or fellows) and assignment of 2 or 3 trainees to the supervising specialist can even increase the volume of patients evaluated, and revenue generated.

Third, trainees have the opportunity to evaluate patients with medical issues of varying degrees of acuity. For those patients with medical issues of a lesser acuity, trainees can be allowed to operate at a different pace in diagnostic, therapeutic, and supportive management. The outpatient setting facilitates the recognition of "red flags" which raise concerns regarding the acuity of the underlying disease process and potentially necessitate hospital admission for expedited management. Recognition of clinical problems also allows issues to be addressed before they produce more severe consequences. This ability to triage appropriately is a key skill in the development of a competent independent practitioner. Continuity of care in the outpatient setting has been shown to decrease hospitalizations, an important point in a time of escalating health care costs [11]. Including training on different levels of acuity and paces of management is optimal for the fostering of a longitudinal care experience. This outpatient longitudinal care can be an integral component of ongoing and future quality initiatives aimed at reducing hospitalizations and length of stay.

While earlier it was noted that seeing different patients with the same disease at different stages can provide a rapid snapshot of the longitudinal perspective, much like a single MRI can provide an understanding of old and new lesions in multiple sclerosis, the outpatient

Table 1
Benefits and challenges of outpatient and inpatient neurology training experiences.

Values	Outpatient experience	Inpatient experience
Real-world experience	Substantial percentage of attending neurologists clinical practice occurs in the outpatient setting. Outpatient clinic is an opportune environment for learning about practice management, a skill many residents feel they have suboptimal experience with in their training.	The degree of inpatient clinical activity for attending neurologists varies, in part at least, based on their subspecialty.
Unique case types	Outpatient neurology provides exposure to commonly encountered disorders such as headaches and back pain as well as a number of less common neurological disorders.	Inpatient neurology provides essential exposure to important types of neurology cases such as strokes, seizures, and encephalopathy.
Procedures	An ideal environment for non-urgent lumbar punctures as well as almost exclusively outpatient procedures such as botulinum toxin injection, deep brain stimulator adjustment, vagal nerve stimulator adjustment, and intrathecal pump adjustment.	Ample opportunities for urgent lumbar punctures. Exposure to predominantly inpatient procedures such as intrarterial thrombolysis and clot retrieval.
Case volume	This can be more easily adjusted. It is possible to purposefully manage the case volume to target patient care and trainee education goals.	Dependent on hospital admissions, which can be variable.
Acuity of clinical presentations	While most presentations are not acute, the outpatient clinic provides opportunities for trainees to triage the acuteness of the presentation and in turn initiate the appropriate management which may include hospital admission.	Acute presentations are predominantly seen.
Continuity of care	Trainees can follow specific patients over the course of their training experience. This allows them to build doctor-patient relationships, follow the natural progression of diseases, and directly monitor the effects of specific interventions.	Trainees may have continuity during the hospital course. This may also be extended by integration of the patients into continuity clinics. However, suboptimal post-hospitalization show rates are a potential limitation of this.
Speed of diagnostic work-up	The lesser acuity of the outpatient setting lends itself to a more sequenced work-up in which the next diagnostic decision is dependent on the results of the preceding work-up. Trainees learn to be comfortable with the diagnostic uncertainty and can hone the skill of explaining this to patients.	Short-term return of results of diagnostic and therapeutic choices can provide strong reinforcement of clinical behaviors. However, the acuity of the presentation and the desire to limit the duration of the hospital stay can lend itself to a "shotgun" approach to diagnostic work ups.

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