Neurohospitalists Enhance Resident Perception of the Educational and Clinical Value of a Night Float Rotation

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Abstract

Background and Purpose: Neurology residency training programs have been profoundly impacted by recent changes in resident duty hours, workloads, and supervisory requirements. In response, many programs have adopted a night float coverage system to minimize the requirements for overnight call. The majority involves residents working a block of night shifts in what is typically a service-oriented rotation. Recently, concerns have arisen regarding the impact of this design on resident education and patient care. We have developed a novel on-site nighttime neurohospitalist model for the explicit purpose of steepening the initial learning curve for neurology residents in an effort to rapidly improve their neurological skills and, in conjunction, overnight patient care. We surveyed residents after the initiation of this system to assess their perception of the impact of direct overnight supervision on education and patient care. **Methods:** As part of ongoing quality improvement efforts, surveys were administered to neurology house staff at a tertiary academic medical center after they had completed service on the night float rotation both with and without an attending in the hospital using a retrospective pre/postdesign. **Results:** There was a robust positive impact on resident's perception of overall quality, educational value, and clinical quality on the night float rotation with an attending on-site. Despite an overall perception that their autonomy was maintained, residents believed barriers to contact the attending were lower, and attending interaction during critical decision making was more frequent. **Conclusions:** Direct overnight supervision by a neurohospitalist enhances the educational value and care quality on overnight resident rotations.

Keywords

residency, education, night float, supervision, autonomy, neurohospitalist, quality

Residency training programs have been profoundly impacted by restrictions on resident duty hours, workloads, and supervisory requirements implemented by the Accreditation Council for Graduate Medical Education over the past decade, and neurology residencies are no exception. In response, many programs have undergone substantial changes in design and schedule; most have adopted a night float coverage system to minimize requirements for overnight call and comply with duty hour restrictions. Although there are a variety of models in practice, the majority involves residents working a block of night shifts to cover consultations, admissions, and urgent issues for established inpatients.¹⁻⁴

Night float is typically a service-oriented rotation with self-guided learning being the norm and opportunities for attending interaction and patient follow-up limited to phone contact. Although these systems decrease continuous and total work hours for residents, concerns have been raised regarding their impact on resident education and the quality of patient care delivered.⁵⁻¹¹

Since more stringent duty hour restrictions for interns (postgraduate year 1 [PGY-1]) were enacted in 2010, first-

year neurology residents (PGY-2) are less experienced than they were even 2 years ago. This has placed many neurology programs in a position, where primary overnight responsibility for inpatient consultations, emergency room consultations, and cross-cover issues is in the hands of physicians and less proficient than at any time in the past.

In response, we have developed a novel on-site nighttime neurohospitalist model for the explicit purpose of steepening the initial learning curve for neurology residents in an effort to rapidly improve their neurological skills and, in conjunction, overnight patient care. We surveyed residents after the initiation of this system to assess their perception of the

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impact of nighttime attending physician supervision on education and patient care.

Methods

The Emory University Neurology Residency Program currently consists of 22 house staff. All first-year neurology residents (PGY-2) perform 4 to 8 weeks of night float at Emory University Hospital (EUH), a 585-bed academic tertiary care medical center. Responsibilities include performing neurology consultations for the entire hospital including the emergency room, admitting neurology patients to the floor and intensive care unit, cross-covering 3 primary inpatient services (general neurology, stroke, and epilepsy monitoring unit) for overnight issues, and answering calls from outpatients to the clinic emergency line. Every night, there is a single resident on duty in the hospital from 6 PM to 7 AM. Prior to June 2011, there was never an attending neurologist physically present in the hospital at night. When no attending is present, supervision for the resident is provided by an on-call attending who is at home and directly available by pager. The night float house staff are expected to contact the attending physician whenever they feel it is necessary but always to discuss a new consultation or admission prior to disposition.

We started a neurohospitalist program at the beginning of the academic year in 2011. As part of the establishment of that program, our neurohospitalist attendings rotated across our inpatient services to assess needs and opportunities for improvement in clinical care and resident education. This included 17 weeks of night float coverage while physically in the hospital from 5 PM to 8 AM from July 2011 through October 2012. During that time, the neurohospitalist attending worked directly with the night float resident, including bedside staffing of every new patient, direct observation of multiple consultation histories and examinations, assistance with patient triage, and direct or indirect supervision of any inpatients undergoing a major change in status. In addition, the neurohospitalist was available to see the patients independently if the need arises due to spikes in patient volume, which typically occurred once or twice a week. Residents completed their night float rotations in 2-week blocks, 6 days with an attending in-house and another 6 with the attending available by phone.

This study is an analysis of a portion of our ongoing evaluation of neurohospitalist impact on the quality of patient care and resident education at EUH. Surveys were administered to the neurology house staff after they had completed service on the night float rotation both with and without an attending in the hospital with the goal of assessing the relative value of the proposed care model. Using tools from 2 recent night float studies on medicine services as guides, a survey was created to examine the neurology house staff perceptions of the night float rotation.^{12,13} It was composed of Likert-type questions asking residents to (1) rate the overall quality of the night float rotation (1-5, *poor to excellent*); (2) rate their level of

agreement or disagreement (1-5, *strongly disagree to strongly agree*) with statements concerning the educational and clinical value of night float, attending supervision while on night float, and the impact of an attending being physically present on education, clinical care, and neurology skills; and (3) judge frequency of attending contact during certain clinical situations (1-5, *never to always*).

The survey employed a retrospective pre/postdesign whereby residents were asked to rate their different night float experiences at a single point in time after they had experienced both the models.¹⁴ In all, 3 residents completed two 2-week night float blocks prior to survey, and the remainder completed 1. Surveys were distributed via the residency program coordinator, and responses were anonymous; no identifying data were collected. There was no incentive offered to complete the survey.

Survey data were analyzed using Prism GraphPad, and pre/postresponses were compared by paired *t* test; responses to questions about the overall impact of a night float attending were compared by single-sample *t* test. In both the cases, a *P* value less than .05 was considered significant.

Results

Over 17 weeks, 14 different neurology residents rotated on night float with 1 of the 3 attending neurohospitalists for at least a week. Resident rotations were in 2-week blocks, and all the 14 residents included completed a survey immediately after they had completed 1 to 2 weeks with an attending present and an equal amount of time with an attending available by phone.

An on-site neurohospitalist had a robust positive impact on resident's perception of overall quality of the night float rotation (Table 1). In particular, mean overall education quality and adequacy of attending supervision increased from "good" to "excellent." As can be seen in Figure 1, the proportion of residents rating their experience as "very good" or "excellent" was dramatically higher when the attending was present in the hospital with regard to quality of education (93% vs 21%), adequacy of supervision (100% vs 21%), and appropriateness of workload (57% vs 7%). Notably, there was no change in the perceived quality and diversity of pathology to which the residents were exposed on the rotation.

Additionally, the perceived educational and clinical value of the rotation was significantly higher with an attending on-site (Table 1 and Figure 1). Although the proportion of residents who agreed they had sufficient autonomy to make decisions did not change (92% vs 93%), the proportion that agreed there was adequate attending supervision increased substantially with an attending in the hospital (93% vs 21%). In addition, a higher proportion of residents agreed that the attending had a positive impact on patient care when present in the hospital (100% vs 54%).

The frequency of attending contact during critical decision making was increased across the board, with the exception of

Table 1. Evaluation of Night Float Rotation With an Attending On-Site as Compared to Off-Site.^a

Item	Off-Site, Mean (SD)	On-Site, Mean (SD)	P Value
Overview items; poor (1) to excellent (5)			
Overall quality of education from rotation	2.93 (0.73)	4.50 (0.65)	<.0001
Quality and diversity of pathology seen	3.64 (0.74)	4.00 (0.88)	.0548
Adequacy of attending supervision	2.93 (0.83)	4.71 (0.47)	<.0001
Appropriateness of workload	2.64 (0.74)	3.79 (0.97)	.0019
General perceptions [strongly disagree (1) to strongly agree (5)]			
Night float is a valuable educational rotation	3.57 (0.94)	4.57 (0.65)	.0009
Night float is a valuable clinical rotation	4.07 (0.62)	4.64 (0.50)	.0011
I have adequate overnight supervision	2.86 (0.86)	4.71 (0.61)	<.0001
I have sufficient autonomy to make clinical decisions	4.21 (0.58)	4.38 (0.65)	.7214
Overnight supervision by an attending positively impacts patient outcomes	3.69 (0.95)	4.77 (0.44)	.0028
Incidence of attending contact during critical decision making; never (1) to always (5)			
Receive transfer from outside facility	4.00 (1.41)	4.93 (0.27)	.0366
Consultation or admission from the ER	5.00 (0.00)	4.93 (0.27)	.3356
Prior to ordering a noninvasive diagnostic procedure	2.86 (1.35)	4.29 (1.20)	.0021
Prior to ordering an invasive procedure	4.57 (0.76)	4.79 (0.58)	.1894
Prior to initiation of IV meds (vasopressors, IVIG, steroids, etc)	4.00 (1.41)	4.57 (1.09)	.0877
Patient experiencing an adverse event, regardless of cause	4.00 (1.11)	4.86 (0.36)	.0166
Reasons for reluctance in contacting an attending; strongly disagree (1) to strongly agree (5)			
Fear of waking or disturbing an attending	3.21 (1.19)	2.00 (1.04)	.0088
Fear of revealing knowledge gaps	2.43 (1.09)	2.07 (1.07)	.1739
Would rather make decision on own	3.21 (0.89)	2.71 (1.38)	.0285
Will not change patient outcome	3.36 (1.15)	2.50 (1.29)	.0026

Abbreviations: IV, intravenous; IVIG, intravenous immunoglobulin; SD, standard deviation.

^a Items scored on Likert-type scales as described previously. *P* values obtained by paired *t* test.

staffing new patients, which the residents were always required to do (Table 1). Most prominent was an increase in the proportion of residents who would contact the attending more than half the time for a noninvasive diagnostic test from 29% to 79%. However, the proportion of residents who would contact the attending more than half the time was also higher for receiving outside hospital transfers (100% vs 71%) and reporting any adverse event affecting a patient (100% vs 71%). Small increases in frequency of contact when ordering invasive procedures (93% vs 86%) and initiating intravenous medications (93% vs 79%) were not significantly different.

A majority (64%) of residents agreed any reluctance in contacting the overnight attending at home was based on fear of waking or disturbing them. When the attending was in the hospital, only 14% had the same concern. Also notable was that 50% of the residents agreed that contacting the attending at home would not change patient outcome; this proportion decreased to 21% when the attending was on site.

General impressions about having an attending in the hospital at night were uniformly positive (Table 2). The vast majority of residents (93%-100%) agreed they enjoyed the experience of having an on-site attending and felt it improved overall education, clinical care, and specific aspects of their neurological patient care skills.

Of the 14 residents surveyed, 11 provided additional narrative comments. One was mixed and particularly highlighted a concern about autonomy "Provided excellent education but sometimes takes all decision making out of the resident's

hands." The remainder was singularly positive. "Having an attending in-house really helps with educational experience for PGY-2 since there is direct feedback on my exam, localization, and differential diagnosis for critical decision making." "Having an attending physically in-house allows for direct, personalized teaching/learning." "Dr ____ helped me fine tune the neuro exam." "The best rotation ... extremely educational for me." "Critical thinking was encouraged with each case." "Neurological exam and management of uncommon presentations improved with attending guidance." "Dr ____ observed every H&P and provided feedback about each encounter."

Discussion

This study demonstrates that direct supervision by an on-site attending neurohospitalist enhances the educational and clinical value of the neurology night float rotation. Perception of patient care quality also improved as did perception of adequacy of attending supervision. Although resident-attending interaction was increased, residents maintained a sense of autonomy in their decision making.

The results of this study are robust and in agreement with 3 recent studies undertaken at internal medicine residencies. In 2010, Defilippis et al reported a high level of resident satisfaction regarding patient care when an attending was present in the hospital for 6 hours each night.¹³ Residents also felt the on-site attending was helpful with patient evaluations and

Figure 1. Neurology resident perceptions of educational and clinical value of night float rotation are improved by an on-site neurohospitalist. A, When asked to rate overall quality of the night float rotation with respect to education, pathology seen, supervision, and workload, a much higher proportion of residents rated their experience as “very good” or “excellent” when an attending was on-site. B, When asked their level of agreement with positive statements about the value of the night float rotation with respect to education, clinical experience, supervision, and autonomy, a much higher proportion of residents “agreed” or “strongly agreed” that night float was valuable when an attending was on-site. See Table 1 for more details.

developing treatment plans. Although results were not directly compared to those without attending hospitalists present, they were substantially better than historical results at the same hospital. Trowbridge et al reported that nearly all residents and attendings preferred an on-site direct supervision model of night float to indirect supervision by phone.¹⁵ Both residents

and attendings believed that patient care was improved, with fewer errors and better efficiency; both the groups also felt that education was better with direct supervision.

Haber et al reported increases in resident perception of clinical and educational value of night float without a decrement in autonomy.¹² That study was particularly powerful since, although still retrospective in each case, surveys were administered to residents both before and after institution of a “nocturnist” program. Furthermore, data were obtained regarding when and how often residents would contact attendings as well as barriers to increased resident–attending interaction. Frequency of contact was significantly increased when an attending hospitalist was on-site. Not surprisingly, residents felt somewhat more comfortable calling attendings when they were present in the hospital, but there remained some persistent reluctance.

The present study confirms those results. As expected, neurology residents were more likely to contact attendings in multiple clinical scenarios when the neurohospitalist was on-site. Barriers to calling the attending, including fear of awakening them, were nearly but not completely removed. Interestingly, although residents tended to agree that calling the attending at home would not change patient outcome, they tended to agree that calling the on-site attending would. This is concordant with data regarding increased faculty presence on inpatient services during daytime hours.¹⁶ Although it could be a revealing area of study, we did not measure specific outcomes from attending–resident interactions, such as whether greater attending interaction led merely to greater confidence in the plan, minor or stylistic adjustments to patient care, or major changes in diagnosis or management. Informal canvassing of residents and attendings at morning report revealed results from all the 3 categories.

Residents overwhelmingly enjoyed having an attending in the hospital overnight. All believed that the on-site attending improved patient care, education, and specific aspects of neurology education. Although we did not formally evaluate attending opinions, informal feedback from our neurohospitalists and other ward attendings confirmed the positive impact on residents’ clinical skills. In general, neurohospitalists were positive about their short stints in the hospital overnight; whether or not that would persist in the face of substantially more night work remains to be evaluated.

This study has several limitations. First, the outcome measures were subjective; perceived quality of education is not equivalent to actual quality. Ideally, specific measures of core competencies would be measured before and after implementation of a change such as on-site supervision during night float. However, such a study would not be immune from confounding variables and would be time and labor intensive to complete. The current limitations regarding resident duty hours require immediate action. Additionally, a positive attitude and perception of value are thought to be very important for learning, and these were clearly improved by direct supervision overnight.^{11–13,15}

Table 2. Impressions About Having an Attending in the Hospital at Night.^a

Item	Mean (SD)
I enjoyed having an attending in the hospital on the EUH night float rotation.	4.86 (0.53)
Having an attending in the hospital improved patient care on the EUH night float rotation.	4.86 (0.36)
Having an attending in the hospital improved education on the EUH night float rotation.	4.93 (0.27)
My neurological history taking has improved as a result of having an attending in the hospital at night.	4.64 (0.63)
My neurological exam has improved as a result of having an attending in the hospital at night.	4.64 (0.63)
My neurological localization skills have improved as a result of having an attending in the hospital at night.	4.64 (0.63)
My diagnostic accuracy has increased as a result of having an attending in the hospital at night.	4.79 (0.43)
My understanding of certain neurological disorders has increased as a result of having an attending in the hospital at night.	4.93 (0.27)

Abbreviations: EUH, Emory University Hospital; SD, standard deviation.

^a Items scored on a 1-5 Likert-type scale from "strongly disagree" (1) to "strongly agree" (5).

Second, the study was retrospective, and as a result the study was subject to all of the typical limitations of such a design, including recall bias and uncontrolled conditions. The pre/postdesign was an advantage in this regard. This design has been shown to help avoid response-shift bias and provide more accurate information in situations where the respondent is unfamiliar with the situation or subject matter prior to participation.^{14,17,18} For example, in this study, residents might have misestimated the relative impact of an on-site attending had they been asked to rate that experience prior to having experienced being in the hospital alone.

Third, this is a small study at a single site. Although the results are highly encouraging, generalization to other neurology programs with different designs may not be fully possible. For example, many programs employ a night float system in which there are both a senior and a junior resident in the hospital overnight. The benefit of an on-site attending may be lessened in that situation, since the senior resident is available to provide guidance and feedback. The finding that residents would more often rather make decisions "on their own" in the absence of an on-site attending, although only weakly significant, may point to a potential advantage to a senior resident supervisor. A comparison between the 2 models (attending vs senior resident supervision) would be an interesting study. On the other hand, senior residents can also benefit from individual attending teaching, and in similar situations in internal medicine residencies, attending presence at night has still been preferred.^{12,13} Regardless of the supervisor, enthusiasm, clinical acumen, and skill as a teacher are paramount to their success.

Despite the limitations, the magnitude of the differences was substantial. The subjective ratings of the night float rotation with the attending neurohospitalist on-site were extremely positive by any measure and, in our particular case, were the highest of any rotation in our residency program. Despite resident perception of maintained autonomy, some concerns by the neurohospitalists and other attendings have persisted about their learning to make decisions independently.¹⁹ We have mitigated these for the present by continuing a hybrid experience, whereby each resident spends night float time both with and without an attending present. As neurohospitalist programs develop further and their role in

education is better defined, assessment of attending perceptions and objective measures of core competency will become increasingly important.

Should it be determined to be unequivocally beneficial, the question of how to financially support a neurohospitalist on-site in the hospital overnight will become paramount. It is already an obstacle confronting other hospitalist and residency programs; in fact, given the current state of health care finances, it may be an insurmountable one. Even for larger programs such as internal medicine, clinical revenue is insufficient to support attending salaries. This is because the ward attending later in the day would have captured the majority of revenue in any case, and a higher proportion of nighttime patient encounters do not generate a bill, such as cross-cover calls for established inpatients. The hurdles are even higher for neurology departments, since overnight patient volume is much lower than for internal medicine. From a financial standpoint, implementing an on-site, direct supervision, neurohospitalist-based night float model should be considered an investment in resident education and quality patient care that can only be made with direct involvement and financial support from the hospitals served by house staff.

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