Neurosurgery Resident Leadership Development: An Innovative Approach

Jeffrey E. Pettit, PhD
Nader S. Dahdaleh, MD
Gregory W. Albert, MD
Jeremy D. Greenlee, MD

Department of Neurosurgery, University of Iowa, Hospitals and Clinics, Iowa City, Iowa

Correspondence:
Jeffrey E. Pettit, PhD,
1-204 Medical Education Bldg,
University of Iowa,
Iowa City, IA 52242.
E-mail: jeffrey-pettit@uiowa.edu

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A great deal of time and resources go into the development and training of neurosurgeons. One area that has minimal literature and assessment is leadership development. Under the core competency of interpersonal and communication skills, the Accreditation Council for Graduate Medical Education has indicated that residents are expected to work effectively as a member or leader of a healthcare team. This article reveals how a structured leadership program was developed so that residents are better prepared for the role of chief resident and future leadership roles. Beginning in October 2006, residents attended a series of 1-hour workshops conducted monthly. Topics included leadership style, conflict management, effective feedback, team building, team leadership, motivation, and moving from peer to leader. A retrospective pretest was conducted at the end of the program. Residents reported a significant knowledge gain for the majority of topics. Resident comments indicated a greater awareness of the impact of leading and ways to improve their personal leadership. Quantitatively and qualitatively, residents and faculty reported that the leadership program made a significant impact on the development of future neurosurgical leaders.

KEY WORDS: Academic neurosurgery, Leadership, Residents

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A great deal of time and resources go into the development and training of neurosurgeons. Their clinical skills and knowledge are developed through rigorous testing, experience with and exposure to many types of patients, experience with a wide variety of surgical techniques, and keeping up with the latest research. Many hours go into studying the minute details of the anatomy, physiology, and pathophysiology of the brain, spinal cord, and peripheral nervous systems, even before the first incision is made. These clinicians will become the future leaders of neurosurgery. The culmination of clinical training is frequently as chief resident in their final year. After leaving the residency, practicing neurosurgeons might lead a clinical practice, enter an academic position, or work within healthcare administration. All of these career paths require some degree of leadership ability. Most neurosurgeons who assume leadership roles have never received formal instruction in leadership or management.[1] What training in these areas that residents do receive is from observing role models and life experiences.

With the implementation of the Outcome Project by the Accreditation Council for Graduate Medical Education,[2] 6 competencies have become the core curriculum for all residency programs. Two of the competencies, professionalism and interpersonal and communication skills, are directly connected to leadership development. Professionalism requires that residents demonstrate many of the characteristics of a good leader: compassion, integrity, respect, accountability, and responsiveness. Under the interpersonal and communication skills competency, residents are expected to work effectively as a member or leader of a healthcare team or other professional group. It also indicates that "teamwork" training is needed, but "on-the-job" training without structured teaching is not sufficient for this skill.[3] With this new emphasis, programs must demonstrate how these competencies are integrated into the resident curriculum.

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Relatively few studies have addressed leadership within neurosurgery. Giller[1] asserts that most neurosurgeons assume leadership roles yet have never received formal instruction in leadership or management. Brock[4] found that self-awareness is the most common leadership quality among prominent neurosurgeons. Ausman and Pawl[5] indicated that leadership requires creativity, devotion to principle, vision, and entrepreneurship. None of these articles specifies the competencies, activities, or methods that should be used to develop neurosurgeon leaders. A great deal more research in leadership is directed at general surgeons.[6-11] These articles indicate that physicians, especially surgeons, are the ideal leaders for health care in the 21st century. University surgeons, including those in training, are exposed to an environment that is rich in leadership learning opportunities. Surgeons need advanced skills in business, finance, organizational management, strategic and tactical planning, conflict resolution, team building, negotiation, and leadership. Residents in surgery see these nontraditional topics as an important part of professional education, but they do not necessarily feel confident or competent in these areas. Therefore, leadership and learning are inextricably linked. The purpose of this article is to report on a leadership development program designed and implemented specifically for neurosurgery residents. The objective of this program is to provide formal leadership training to residents to help them be better prepared not only for the role of chief resident but also as successful future leaders in their careers.

BACKGROUND

The 6-year neurosurgical residency program at our institution is designed to prepare residents for careers as surgeon-scientists and to become future leaders in academic neurosurgery. The program uses the apprentice model and relies heavily on the leadership of the chief residents. In 2006, the neurosurgery residents approached the department chair with a request to help them develop their leadership skills. In the past, the transition between old and new chiefs was erratic; some were better prepared than others to take over as leaders. The department relied on the assumption that highly intelligent and dedicated residents would make effective chief residents. Occasionally, this assumption held true. One of the current chiefs had received formal leadership training through the military and suggested that the department develop a similar approach. Through the Graduate Medical Education office, the department was able to contact the primary author (J.E.P.) for assistance in this endeavor.

Meetings were held with the department chair, the assistant residency program director, and the 2 current chief residents to better understand their desires and ideas. From these meetings, the following goals were created for the overall program:

1) Each resident will have gained knowledge and acquired tools related to leadership.
2) Each resident will understand the role of a leader in general and specific to the department.
3) Each resident will be better prepared to lead peers and junior residents.
4) Each resident will acquire leadership knowledge and skills that will be applicable in future stages of his/her career.
5) Each resident will gain a better understanding of his/her leadership style and abilities.

In addition to understanding the desires and ideas of the faculty and residents, the primary author also shadowed the resident team during morning rounds on many different occasions. These experiences provided him with a better understanding of the residents' work environment and allowed him to observe the leadership approaches of the current chiefs.

MATERIALS AND METHODS

Based on the meetings with faculty and residents, a leadership program was created for the 2006–2007 academic year. One session was held each month. The topics included leadership styles, conflict management, effective feedback, team building, team leadership, motivation, and moving from peer to leader. The 1-hour sessions were highly interactive and thought-provoking. In the first session, all participants were given a notebook with self-assessment activities, case studies, and reading materials collected from healthcare and business literature.

The emphasis of this year was on providing the residents with an opportunity to discover their personal approach in leading others. Each of the sessions required completion of a self-reflection exercise, interactive lecturing, and discussion on the applicability of the topic to residents. Examples of the various sessions included the following:

- Leadership styles: Residents were given an instrument to assess their style based on Blake and Mouton's Leadership Grid, received an explanation of the various styles, and participated in discussions on how their style would affect the team's performance.
- Conflict management: A questionnaire that allowed each resident to identify his/her conflict management style was used, along with an explanation of the styles, when each was appropriate, and how her/his style positively or negatively affected the team.
- Communications styles: A commonly used communication instrument was used for self-assessment, with a description of the different styles and discussion of how the resident's style affected the other residents, nurses, staff, and faculty.
- Motivation: Self-assessment was done with the Theory X-Y instrument, along with an explanation of task versus people beliefs in motivating others and a discussion of various methods for motivating individuals.

Supplement Digital Content 1 (http://links.lww.com/NEU/A352) contains a description of the neurosurgery resident leadership program as conducted at the University of Iowa Hospitals and Clinics. The majority of residents, excluding those who were on-call, attended each session.

At the end of the final session, a retrospective pretest was used to measure changes based on the leadership program. This evaluation instrument (Table 1) consisted of 20 items and used a scale of 1 to 5 (1 = none, 5 = a great deal) or not applicable. Each item was divided with a "before the program" and "end of program" response section. Participants were asked to answer the items in regard to how closely they describe their knowledge about leadership at the beginning and end of the workshops. Paired *t* test was used for statistical analysis. Retrospective pretests are administered at the end of an intervention, at the same time

TABLE 1. Retrospective Pretest

1. Understand my style or approach to leadership
2. Understand how my leadership style can work effectively with other styles
3. Describe the characteristics of effective leaders
4. Understand my approach to managing conflict
5. Understand how my conflict management style can work effectively with other styles
6. Understand how to use the different conflict management styles
7. Understand my style of communicating with others
8. Understand how my communication style can communicate effectively with other styles
9. Understand how to give effective feedback
10. Understand the role of a team member
11. Understand how my team member style can work effectively with other styles
12. Describe the characteristics of an effective team
13. Describe how my leadership style affects the team
14. Understand the dynamic role of team leader and how it changes as the team matures
15. Understand the differences between a Theory X or Y leader
16. Describe the components of performance as a function of ability, motivation, and opportunity
17. Identify approaches that can be used to motivate a team member
18. Understand how my leadership style, conflict management style, communication style, team player role, and attitude toward teams affect my leadership
19. Identify areas for improvement regarding my leadership development
20. Describe how to be an effective leader

and often on the same form as posttest ratings.[12] This method avoids response shift bias because participants are rating themselves with a single frame of reference on both the posttest and retrospective pretest.[13] Lam and Bengo[14] indicate that change measurements obtained from the retrospective pretest method often are more accurate estimates of change than those obtained from the traditional pretest-posttest design.

In addition to the 20 items of the questionnaire, participants were asked to respond to the following open-ended questions:

1. What was your perspective(s) on leadership before the program?
2. What is your perspective(s) on leadership at the end of the program?
3. For future sessions, what topic(s) of leadership would be most beneficial to you?

RESULTS

Nine residents (of 11 total in the program) attended the final workshop and completed the retrospective pretest questionnaire. The group mean and SD for the retrospective pretest were 2.92 and 0.94; the posttest mean and SD were 4.61 and 0.57. The results indicate a significant increase in leadership knowledge and its applicability to becoming a better leader (2-tailed $P < .001$ with t = 4.61). Table 2 indicates the pretest and posttest averages and SDs per resident.

TABLE 2. Pretest-Posttest Results per Resident

Resident	Pretest	SD	Posttest	SD
1	2.40	1.046	5.00	0.000
2	3.15	0.875	4.90	0.308
3	3.30	0.979	4.80	0.523
4	4.05	0.224	5.00	0.000
5	2.30	0.801	4.25	0.716
6	2.95	0.224	4.90	0.447
7	3.35	0.875	3.85	0.366
8	2.65	0.587	4.45	0.510
9	2.15	0.745	4.35	0.489

The following are sample responses to the open-ended question, What was your perspective(s) on leadership before the program?

- Leadership efficacy can be judged on team performance/results, but leaders are highly variable in their approach, and it is difficult to change leaders or tangibly alter their efficiency.
- I knew leadership was a lot of work, but I did not appreciate the details of the job.
- Leadership requires one to lead by example. After the course, I know the above is not sufficient.
- Leadership (ie, good leadership) is crucial to team success and, more important, patient outcomes.
- I felt leadership as primarily by feel. I now know strategies that can be used.
- It is the most important attribute required to reach the highest level of this profession.
- My impression of a leader was that he/she is a person who dictates orders to make team members achieve targeted tasks/goals.

The responses seem to indicate that leadership was inherent to only a certain few people and that it was more of a directive style.

The following are sample responses reported by the same group of residents to the question, What is your perspective of leadership at the end of the program?

- There are several core characteristics of effective leaders and high-yield skills that, given appropriate effort and energy, can have a significant impact on team performance.
- I feel now that I have more tools in the toolbox to deal with problems. A true leader must be able to balance being in charge with caring for the well-being of his constituents.
- There is actually an active component that can be improved upon above and beyond simple experience.
- I think leadership is something I can actively work on improving.
- A leader should be wholesome. There are many objective and diverse leadership styles, but probably for a successful leader, collaboration should be part and partial.

The perspective of residents is that leadership is something that they can improve on and that they have gained useful tools for future situations.

DISCUSSION

There is little question that leadership skills are very important for neurosurgeons. Although several articles indicate that leadership development is critical and describe what types of leadership behaviors are important for neurosurgeons,[1,3,4,15,16] a method for developing their leadership abilities is lacking in the professional literature. Additionally, departments are required to demonstrate resident competency in the core areas of professionalism and interpersonal and communication skills. This article introduces a formal program for improving the leadership skills of residents that helps to prepare them for chief residency and future careers. It also provides a method that focuses on 2 of the 6 core competencies. The program was created by analyzing the leadership needs from both the residents' and faculty's perspectives. The program was incorporated into the formal residency curriculum and supported by the department. A statistical comparison using a retrospective pretest technique indicated that the program had a statistically significant impact on the residents' attitudes and understanding of important concepts in leadership. Anecdotal remarks from faculty also indicated an improvement in leadership skills and behaviors. Comments from the residents suggest that they feel better prepared for leadership with more tools in their leadership toolbox.

There is certainly a possibility of bias in the residents' responses, especially because the department head and program director attended all the leadership program sessions. However, one way that we adopted to keep this bias to a minimum was to keep the responses anonymous. Moreover, the overall variability of pretest and posttest results was small as measured by the SD, indicating agreement between most of the residents that their understanding of leadership improved. Throughout the entire program, the chairman acted as a participant and contributed thoughtful and insightful leadership examples from his experience. The overall atmosphere was informal and comfortable.

PROGRAM FUTURE

The neurosurgery resident leadership development program just completed its third year. Residents continue to show great enthusiasm for the sessions. The department chair has attended all sessions and provided excellent examples for success and challenges from his personal experience. In the second year, the focus of the topics was to investigate more deeply many of the subjects from the first year. In addition, new teaching approaches were used. A movie clip from *Remember the Titans* was used as the background for a session on "attitude reflects leadership." Another experiential teaching approach consisted of engaging the residents in a High Elements course (similar to ROPES training—engineered outdoor challenge course structures built to engage participants in many aspects of team building, trust, communication, and leadership; most have a high [activities $\geq$ 2 m above ground] or low [activities $<$ 1 m above ground] component) facilitated by the University of Iowa Recreation Department. In the third year, many of the sessions were a refresher of the material used in the first year. New topics included change management, building trust, and giving directions.

In addition to the monthly leadership sessions, the primary author began conducting coaching sessions for the upcoming chief residents. These sessions consisted of biweekly meetings in which the 2 future chiefs began to explore how they would work together as leaders, to examine typical issues they will face as leaders, and to investigate further their own personal styles of leadership. Feedback from the department chair and faculty indicates that the transition to the incoming chiefs has been much smoother and more efficient in the last 2 years.

As for the future, the vision is to recycle the first year's information with updated material. This will allow the newer residents to conduct self-assessments of their leadership philosophies and provide the more tenured residents with an opportunity to compare their self-views of leadership with their actual experiences as leaders in the department. There is ongoing support from the faculty and the department chair to continue the leadership program. This article reports the initial experience with a leadership development program and was limited to a retrospective pretest-posttest and open-ended written comments by residents. There have been several discussions about how to measure the effects of this training. No definitive approaches have been identified, but some of the possibilities include postresidency assessments of residents who have moved into an academic position, 360 multirater assessments at the beginning and end of the academic year, and a journal for self-reflection regarding leadership abilities. Other forms of evaluation might include a simulation, either in real life or computer based, of a conflict resolution (or other leadership-related) scenario in the vein of the current medical school observed structured clinical exams.

CONCLUSION

Beginning with a request from the neurosurgery residents, a dynamic leadership program has been implemented at our institution. The residents continue to show great interest in the program, and it is fully supported by the department. This program also allows our institution to satisfy subcomponents of the Accreditation Council for Graduate Medical Education core competencies of professionalism and interpersonal and communication skills. Other subspecialties have heard of the program and requested similar sessions for their residents. By the time residents have completed their chief resident year, their ability to function as effective leaders will be greatly enhanced. According to Black,[16] leadership, scholarship, teaching, and patient-centered care should be the goals of a successful academic neurosurgeon. At our institution, the neurosurgery residency is striving to achieve each of these goals.

Disclosure

The authors have no personal financial or institutional interest in any of the drugs, materials, or devices described in this article.

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COMMENTS

Leadership development is an important aspect of neurosurgical training, one that has traditionally been assumed to develop through apprenticeship methods, ie, watching and imitating model mentors or learning to avoid ineffective or destructive behaviors. For the fortunate few, and for some with more natural leadership instincts or relevant related experiences, such indirect methods are successful. However, for the rest of us, leadership qualities are neither natural nor easily absorbed by unconscious imitation. Formal teaching of the qualities and techniques of leadership is a curriculum whose time has come, particularly in a complex healthcare system requiring team management, cooperative planning, and coordinated action.

This article describes a structured leadership development curriculum for residents in training. It has the advantage of specific instruction and the description of the composition of the curriculum, with success illustrated by posttraining testing. Unfortunately, the results are resident self-assessment and expressions of satisfaction by residents and faculty. This article is unable to demonstrate whether the course does, in fact, alter social and leadership behavior and produce better clinical and organizational leaders. However, this drawback is less a criticism than an observation that leadership is a slippery object to catch and quantify. The proposed curriculum fills a training void and seems beneficial in its own right. With time and experience, it may improve, both in techniques and in measurement. We must begin somewhere, and this looks like a promising point of embarkation.

James R. Bean
Lexington, Kentucky

The implementation of the Outcome Project by the Accreditation Council for Graduate Medical Education has been incremental and evolutionary since its initial endorsement in 1999, when the "Minimum Language" version of the General Competencies was first approved. Since then, the Residency Review Committees of the Accreditation Council for Graduate Medical Education, including that of neurological surgery, and the residency training programs accredited by those Residency Review Committees have been under increasing pressure to demonstrate educational outcomes in 6 areas of competency: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and systems-based practice. Although such competencies as patient care and medical knowledge have always been fundamental components of resident education and enjoyed the focused attention of educators and resident trainees alike, the other competencies, if acquired at all, either are present as innate elements of the trainee's persona or are obtained by observation of mentors and colleagues.

The challenge for educators in this era of core competencies has been to devise concrete and measureable methods to educate resident trainees about the more intangible aspects of the competencies such as professionalism and interpersonal and communication skills—critical attributes of a successful neurosurgeon. In addition to being qualitatively effective, the knowledge and skills gained from these methods must be measurable in as objective a manner as possible. In this report, Petit et al describe a protocol for exposing residents to leadership techniques long established in the military, healthcare, and business worlds to aid in the transition to chief residency. By the end of the seminar series, the participants expressed through both a retrospective pretest and open-ended written comments that they were better prepared for the leadership roles that accompany chief residency and beyond. The general topic is highly relevant to the readership of *Neurosurgery* and an important adjunct in enhancing the current neurosurgical training paradigm.

Albert H. Kim
Lance S. Governale
A. John Popp
Boston, Massachusetts