

Farber Hospitalist Service—Last 5 Years of a Service Dedicated to the Medical Management of Neurosurgical Patients

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ABSTRACT

Neurosurgery hospitalists are closely involved in management of patients that undergo neurosurgery. In this article, we outline and discuss the major aspects of the work of these physicians. We emphasize the crucial role of these physicians in both preoperative and postoperative care as well as their roles in education and research. We also highlight the work of the Farber Hospitalist Service (FHS) for the last 5 year period, and point out the differences between FHS and other neurosurgery hospitalist services nationwide. It is hoped that this article will shed light on the work of neurosurgery hospitalists and help to clarify their roles in patient care.

INTRODUCTION

In 1996 Drs. Lee Goldman and Robert Wachter coined the term Hospitalist in their seminal article for the NEJM "The Emerging Role of "Hospitalists" in the American Health Care System"¹. Hospitalists are physicians that specialize in the care of hospitalized patients, and can come from many specialties including Internal Medicine, Family Medicine, Pediatrics and Obstetrics and Gynecology. According to recent data, there were more than 50,000 physicians working as hospitalists in the United States in 2015. Of course, there are many more hospitalists worldwide, although the exact data are not available.

For the adult medical population, Hospitalists typically care for general medicine patients and their associated medical diagnoses such as hypertension, diabetes, etc. However, in recent years, different sub-specializations emerged. For example, there are hospitalists which, together with oncologists, co-manage cancer patients. Similarly, there are hospitalists that focus on taking care of hospitalized gastroenterology patients. This type of collaboration appears to result in effective care, since Hospitalists are better attuned than specialists to the multiple medical problems that most patients have.

A new breed of Hospitalist has recently emerged; Hospitalists who co-manage neurosurgery patients. The role for Hospitalist in this setting has emerged by demand as Hospitalists provide preoperative risk stratification, manage preoperative and postoperative complications and make decisions when to involve specialists other than neurosurgeons. There are over 3500 board certified neurosurgeons in the U.S.A,² and many more worldwide. Of those 3500 neurosurgeons, the exact number who have a Hospitalist care for or co-manage their patients is not known. Yet it is safe to assume that a significant number have their patients cared for or co-managed by a Hospitalist. Therefore, Hospitalists play an important role in management of these patients, and their role will be discussed below. As a final note, it is important to note that these physicians are sometimes called "neurohospitalists". This is a misnomer and should be noted as such. A "neurohospitalist" is a term typically referring to a neurologist which

takes care of hospitalized patients³. Thus, throughout this article, we will use the term "neurosurgery hospitalist" or NH when referring to an internal medicine or family medicine trained physician that specializes in the care of neurosurgical patients.

THE CLINICAL WORK OF THE NEUROSURGERY HOSPITALIST

Neurosurgery hospitalists are physicians that are trained in internal or family medicine, and have specialized in the care of the neurosurgery patient. That said, there are some important features of the neurosurgery hospitalist's work which are different from the general hospitalist. These include a focus on management of CNS infections, management of bleeding in the context of CNS surgery, management of coagulation issues, management of central fevers, management of patients on steroids and steroid-induced hyperglycemia, and many others, as outlined below. Despite the multitude of differences between the work of neurosurgery and general hospitalists, there is no specialized training for the former. At present, NH rely on their own reading and internal hospital guidelines. The Farber Hospitalist Service (FHS) of the Department of Neurological Surgery at Thomas Jefferson University is one of the few hospitalist services around the country. That said, there are unique features of this service, which so far have not been replicated by other similar services. These features, in addition to the all other services provided by FHS, will be discussed below.

Preoperative optimization

Minimizing risks is crucial for the success of a surgical procedure. To do so, it is necessary first to establish the potential risks for a given patient. This process is called preoperative risk stratification. There are inherent risks for every individual procedure. A brain surgery will have different risk than a hernia repair, due to a different organ which is treated, a

different surgical approach etc. That said, every time patient undergoes a surgical procedure, he or she will experience risks which are due to the overall health status and chronic illnesses he or she may have. While a crucial part of the preoperative examination is the evaluation of the cardiovascular health, other illnesses can also increase surgical risk. These include kidney disease, diabetes mellitus, chronic pulmonary disease and autoimmune disease.

At Thomas Jefferson University Hospital, all Neurosurgery patients are evaluated preoperatively by a Physician. These patients are evaluated in the outpatient setting for elective surgeries, and in the inpatient setting by NHs for patient transferred from other hospitals and patients admitted from the Emergency Department. NHs will refer patients to specialists if needed for additional risk stratification and optimization.

FHS has 14 full time physicians, two of which are involved at a full time basis in preoperative risk stratification of patients undergoing elective surgery. In addition, FHS is involved in preoperative risk stratification of patients admitted to the Thomas Jefferson University Hospital dedicated spine unit and the Jefferson Hospital for Neuroscience. On average (this is a conservative estimate), FHS performs this service for around 10 – 20 patients daily in outpatient setting and a similar number in the inpatient setting. This does include weekends, when these patients are evaluated in the hospital setting. Thus, FHS evaluates approximately 120 cases per week, which comes to 6,240 patients per year and 31,200 cases per last two years. This larger number, however, does not tell the full story. Risk stratification is only one part of the preoperative management by NHs in general and FHS in particular.

The second aspect of preoperative care is the optimization of the patient for the procedure. Once the risk is established, it is important to address the issues which can be improved prior to the operation. These include medication management. NHs will make recommendation which medications should be stopped prior the procedure, and the timing of the stoppage. They will also recommend for stress dose steroids in steroid dependent patients. At the same time, they will manage medical issues

which have not been properly addressed prior to procedure. These typically include diabetes mellitus management, since poor blood glucose control may negatively affect wound healing. Similarly, they will make recommendations with the respect to blood pressure management and electrolyte imbalances which are found during preoperative testing. Importantly, if a patient takes anticoagulants, they will recommend discontinuation at an appropriate time before surgery or refer the patient to a specialist. Finally, they will determine if a patient is at risk of infection (for example due to MRSA colonization of nares) and recommend appropriate treatment, and, if acute infection, recommend delaying surgery until infection resolves. In complicated cases, they recommend patient be followed by NH's once admitted to hospital.

Taken together, NHS and FHS play a crucial role in preparation of a patient for a neurosurgical procedure.

Postoperative care

Post-operatively, care for neurosurgical patients is typically managed by a team comprised of neurosurgery nurse practitioners (NPs) and residents who function under the supervision of the neurosurgery attending physician. Common areas for primary team to address are the prevention of deep vein thrombosis, pain management and wound healing. Physical and occupational therapy are also valued members of the team and help to determine the placement of the patient post discharge. In our current model the NH functions as an integral team member as co-managers. Currently we round daily at the bedside with the nurses, NPs, OT, PT and case management. Our FHS hospitalists participate in the management of blood pressure, blood glucose levels and other medical issues including postoperative infection. The FHS is involved as co-managers of the patient alongside neurosurgery, addresses in these issues at a daily basis, and again participates in care of multiple neurosurgical patients.

FHS as a primary care service for neurosurgical patients

Hospitalists traditionally participate in the care of surgical patients as consultants or co-managers in the United States

health care system. FHS here, to our knowledge, constitutes an exception. Over last several years, FHS became a primary service for a number of neurosurgical patients. This model developed out of the need to care for highly medically complex patients who were being transferred to Thomas Jefferson University Hospital from outlying community hospitals, particularly those patients that have certain spine related diagnoses. Specific criteria were created by the FHS in conjunction with Neurosurgery and Orthopedic Spine where certain medically complicated patients being transferred to TJUH could be admitted directly onto the FHS. In these cases the spine surgeon acts as the consultant and the FHS as the attending. The vast majority of patients we care for are patients with infection i.e. epidural abscesses, osteomyelitis, and discitis. This model then allows the neurosurgical team to concentrate on the procedure itself, whereas NH assumes the overall management role. This approach also allows more time for the neurosurgical team to devote to the surgical procedures. In this role, since 2015, FHS took care of 1,100 primary patients, of which 300 had spinal infections including osteomyelitis and epidural abscesses. Of note, the mortality of these patients was much lower than Jefferson average of these patients at other services and the difference was statistically highly significant (unpublished data).

EDUCATION

As noted above, there are some important features of the neurosurgery hospitalist job, which are different from the general hospitalist work, and there is no specialized training for neurosurgery hospitalists. At present, NHs rely on their own reading and internal hospital guidelines, which may well differ from a hospital to a hospital.

This situation may, and likely does, result in different outcomes for neurosurgery patients. Thus, there is an urgent need for a standardized source of information for neurosurgery hospitalists, which would provide a common ground and improve their knowledge and training, in other words, a textbook. FHS realizing the need and demand, thus, together with other

services, produced the first book in the NH field. The "Medical Management of Neurosurgical Patients",⁴ edited by Drs. Rene Daniel and Catriona Harrop, was published in October 2019 by the Oxford University Press. Thus, FHS started to create medical guidelines for NHs, which will help nationwide standardization of care for these patients and thus improve outcomes.

Outside of the textbook, NH's are involved in one on one training of neurosurgery NPs and residents. This is a daily process and a necessary component of the NH's work. In addition, FHS provides lectures for Nurse Practitioners and Nurse Practitioner students on a regular basis.

RESEARCH

Many, if not most neurosurgery departments are located in an academic setting, where research is an important component of their work. As all academic services, FHS is developing its own research program. This include a preoperative care studying role of new

tests in preoperative risk.⁵ The other areas include retrospective studies evaluating the impact of FHS on patient care, morbidity, mortality and length of stay. Finally, FHS is working of development of a research project with the Division of Infectious Diseases, which address identification of bacteria in spine biopsies using state of the art high throughput sequencing. Altogether, FHS published 16 articles this academic year, so far, with six more planned. Research emerged as an important way to contribute to the improvement of outcomes and care for neurosurgical patients.

SUMMARY

Taken together, NHs in general and FHS in particular play a very significant role in management of neurosurgical patients, as well in academic research and education. The next three articles in this issue describe management of illnesses and issues of neurosurgical patients, which are typically managed by FHS.

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