Emerging Post-Hospital Models of Care: A Primer for Stroke Center Leaders

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Abstract

After discharge, stroke survivors are at high risk for secondary stroke as well as readmission to a hospital. While stroke center certification standards emphasize preparing patients and caregivers for discharge, patients discharged to home may experience delays in seeing a community provider and report inadequate preparation for discharge. Several models suggest inpatient stroke programs are assuming additional roles and responsibilities in the management of patients after discharge. Models such as a stroke nurse navigator, post-stroke clinics and other interdisciplinary supported discharge programs may address gaps in care after discharge. Even with this evidence, stroke leaders should evaluate their own patient outcomes to understand their needs and plan services accordingly. Strategies to evaluate discharge outcomes and advocate for services are discussed.

Keywords: stroke, stroke navigation, stroke clinics, care transitions, post-discharge care.

Introduction

As new therapies were developed for treatment of acute ischemic stroke, the network of certified stroke programs evolved to ensure early treatment was available for all who suffer stroke. Protocols and pathways were developed that prioritized the minutes and hours of care after arrival to ensure treatments were administered to maximize patient survival and functional recovery. However, transition from hospital to post-acute care, regardless of the level of care required, is often fraught with challenges. Stroke survivors often report specific and unique challenges at the time of discharge from their acute stroke event. After hospital discharge, stroke survivors are at high risk for readmission to the hospital within 90 days of discharge and are also at risk for a subsequent stroke event. Additionally, stroke survivors often have comorbidities that require further management to prevent another stroke and may suffer new disability increasing the likelihood of a fall or other accident after discharge.

Background

Stroke survivors who are discharged from the hospital to home instead of another facility face unique challenges. One qualitative study reported patients and family of patients with stroke who were discharged home struggled with insufficient services and information, unsatisfactory relationships with their healthcare providers, and mental distress. Because the acute stroke admission is often short, stroke survivors may lack continuity of care related to medication management and clinical management of stroke risk factors.
Historically, inpatient certified stroke programs were expected to prepare patients with stroke for discharge, educate the patient and family, and provide some preliminary anticipatory care. However inpatient stroke programs often failed to take an active role in the coordination or provision of care post-discharge. In the past several years, we’ve witnessed a shift in responsibility and investment in stroke post-discharge care and a move towards a system-approach to care across multiple settings. This shift in responsibility may be partially driven by financial incentives and disincentives related to readmission and an overall move towards systems of healthcare.

A recent study of over 2000 patients discharged with stroke in North Carolina found that continuity of care before, during, and after stroke was associated with care received and cost of care after stroke. Accountable Care Organization (ACO) efforts and growth in hospital systems benefit from developing programs that serve patients across the care continuum. The services provided may range from coordinating post-discharge appointment times and post-discharge follow-up phone calls, to a dedicated clinician navigator who remains connected to the patient to coordinate care over time; these services may even include follow-up at a dedicated post-discharge stroke clinic managed by the stroke program. While these models are rapidly evolving, many stroke leaders still lack clarity regarding the responsibility of the certified stroke program to provide care post-discharge. Therefore, we discuss models of post-hospital stroke care that have emerged recently and provide stroke program leaders suggestions for evaluating their programmatic needs and possible solutions to meet those needs after hospital discharge.
treated with thrombolysis while hospitalized, and then connected with the patient at discharge to discuss the transition plan, follow-up appointments and any planned outpatient testing. The nurse navigator then connected with the patient and family between days 3 and 7 after discharge to review the discharge summary, medications, and plans discussed at discharge. Any issues that the nurse navigator could not address during the follow-up call was referred to the discharging practitioners and/or quality officer. The study included 447 patients (287 before program implementation and 160 after) and the groups were well matched with only higher mechanical thrombectomy utilization and lower pre-admission oral anticoagulant use differing between the groups. The 30-day readmission rate was lower in the navigator implementation group (p=0.025) and the effect remained when accounting for confounding variables.

Other programs have reported decreased stroke-related readmission in patients who received navigator services; stroke navigation has also been shown to improve compliance with in-hospital stroke measures, and follow-up appointments.

**Transitional Stroke Clinics**

Patients may have to wait for multiple weeks or even months to secure an appointment for outpatient follow-up with a stroke specialist such as a vascular neurologist or a neurosurgeon in many areas of the United States. While patients may be able to see their PCP faster, coordination of care between specialist stroke providers and PCPs after hospitalization may remain fragmented. Some inpatient programs have developed transitional stroke clinics that provide outpatient follow-up for one or several visits until the patient is able to have their care resumed by their PCP. Again, these clinics vary in their provider makeup, scope of care, and frequency of patient visits, but all tend to focus on finalizing the stroke evaluation, ensuring an appropriate management plan for stroke risk factors to minimize the risk of recurrent stroke, and identifying patients who are struggling after discharge for any reason. While this intervention has not been studied in large randomized controlled trials, individual programs report encouraging results from their clinics.

There are several reports of advanced practice registered nurse (APRN)-led clinics offering follow-up within 1-3 weeks post-discharge. One study found that patients seen in the APRN-led clinic were less likely to be readmitted within 30 days while other studies found a trend towards less readmission that was not statistically significant, but did decrease time to follow-up and may have an impact on other measures such as satisfaction and implementation of best medical therapy. Additional studies are needed to best understand who benefits from early and organized follow-up and the measures of success for such clinics. As technology advances, remote monitoring of physiologic health measures (e.g., blood pressure, weight, neurologic symptoms) may be incorporated into clinic follow-up.

**Organized Transitional Stroke Care Programs and Technological Advances**

Several recent reports of interprofessional and multi-intervention transitional stroke programs suggest that these endeavors may improve patient outcomes. A Canadian study reported the results of a randomized control trial testing an intensive program for stroke survivors discharged from hospital to community. Patients in the intervention arm
received usual care plus 6 months of transitional stroke care. The transitional care stroke intervention (TCSI) was delivered virtually by a team and included navigation support, team care conferences and additional online resources for patients. These investigators enrolled 90 participants (34 intervention, 40 control). There was no difference in hospital readmission at 6 months, but improved physical functioning, self-management, and patient experience were noted.\(^\text{15}\)

Gzesh and colleagues\(^\text{16}\) reported the results of 3-years of an organized stroke bundle program at a Comprehensive Stroke Center (CSC) that combined inpatient protocolized patient management, transitional care protocols, an educational program, and daily rounding by a stroke nurse navigator focused on patient transitions for 90-days after discharge. The bundle approach was associated with a reduction in the number of patients admitted to a skilled nursing facility (SNF), decreased length of stay for those who were admitted to a SNF, and decreased 90-day hospital readmissions. The program also improved patient engagement.\(^\text{16}\)

In studies and reports on post-hospital care, technology continues to rapidly alter the delivery of care. A recent study from Scandinavia included telerehabilitation as a key component of an early supported discharge program. They utilized technology such as wearable devices, tablets, virtual reality, and photos to provide rehabilitation services remotely. While it was a small exploratory study, the intervention was positively perceived by both patients and rehabilitation providers, and improved functional ability defined as meeting rehabilitation goals\(^\text{17}\). Cui and colleagues\(^\text{18}\) also reported applying machine learning to predict patients at increased need for support at discharge. Wireless remote monitoring devices are already being used to obtain “at-home” physiologic parameters such as blood pressure, blood glucose, oxygen saturation and heart rhythm.\(^\text{19}\) Some of these integrate seamlessly with electronic health records. As technology rapidly advances, its application to transitions of care in stroke programs will likely continue to evolve.

### Models of Stroke Program Post-Discharge Care

Transitions of care for stroke patients are commonly addressed to ensure compliance with stroke certification standards, specifically in conjunction with patient-specific stroke education, a rehabilitation assessment, a post-discharge needs assessment, a 7-day follow-up phone call, and/or a 90-day disability assessment. Comparatively, the studies cited above utilized a significantly more intentional and robust approach for managing stroke patient transitions, finding that this improves patient outcomes, increases patient satisfaction, and reduces subsequent hospital admissions.

Perhaps the most significant questions stroke program leaders should be asking when it comes to stroke patient transitions of care are, “How can we do this better? How can we improve care transitions and improve our stroke patient outcomes post-hospitalization? How can we better identify and address patient health needs that affect their individual outcomes, including their social determinants of health?”

Answering all of these questions involves exploring development of a transitional care program that best fits individual stroke center patient population needs, alongside examination of organizational priorities, and program workflows.
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Analyzing Your Stroke Patient Population’s Needs

The first step in this process is defining stroke patients’ post-discharge needs. To analyze this information, helpful information includes the number of stroke patients discharged to home, inpatient rehabilitation facilities, and skilled nursing facilities, readmissions rates (with particular attention to patients readmitted with preventable conditions), patient/family knowledge and understanding of discharge instructions, clinic follow-up rates, and patients who have a documented social or psychological need that wasn’t addressed at discharge or followed-up after discharge. To obtain a comprehensive understanding of post-discharge needs, stroke leaders must rely on multiple sources of data and information; these include available post-hospital measures, discharge questionnaires, discharge notes, post-discharge follow-up phone calls, and patient satisfaction data. Important assumptions can also be made by examining transition work published by others. Quantifying this information helps define stroke patient needs and promotes prioritization of these needs in the context of the organization’s capabilities. It also helps build context when considering new methods to incorporate into the stroke program that aim to address these needs.

Available Resources and Toolkits

There are toolkits developed by several sources that include documents, tips and resources for organizing a transitions of care program. These are available online and include ideas for implementation, short-intermediate- and long-term goals, action steps, timelines, questionnaires, best practice performance metrics, and more. Stroke program leaders should also utilize resources such as a questionnaires to help identify post-discharge needs, measures for gaps in knowledge faced by patients and caregivers, and tools to measure social determinants of health (SDOH) in five domains (food insecurity, housing instability, transportation needs, utility difficulties, interpersonal safety). Additionally, FindHelp.org is a free, online service, to search for community-based social service providers; this web-based service uses patient zip codes to provide a list of free or reduced cost services such as food, housing, care and transportation, and it can assist caregivers to find local food pantries, housing, utilities, financial, and phone services assistance programs.

Collecting Relevant Discharge Data

Just as in ongoing stroke program evaluation, stroke transitions in care programs require systematic review for improvement. A data-driven program design cannot be overemphasized. While data derived to support the planning process may be used for ongoing review, there are additional tools that may be useful. In addition to the toolkits mentioned above, the American Heart Association’s Get With The Guidelines Patient Management Tool has a post-discharge data collection tab. Additionally, for those participating in the Paul Coverdell National Acute Stroke Program, a post-discharge measure set is available. Other post-discharge measure sets can be found online.

Leadership Buy-In

The decision to pursue incorporation of new or more robust care transitions for stroke patients requires leadership and other stakeholder buy-in. Anticipated barriers include:
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- Lack of administrative awareness and appreciation of post-discharge stroke care;
- Availability and cost of needed resources such as staff, clinic space, technology and electronic health record needs;
- Potential for territorality and “turf” battles; and,
- Billing support.

Stroke program leaders must be prepared with data that illustrates the benefits of a transitional care program. Needed resources, whether new, realigned, or outsourced, must be justified to leadership using both quantitative and qualitative findings. The collection of data in the analysis phase may help give hospital leaders a clear picture of the needs a transition program will aim to fill, as well as the potential benefits.

Program leaders should build a story that clearly illustrates the transition problem and its downstream effects on readmissions, satisfaction, and emergency department visits. These findings should be further supported using published evidence that demonstrates the impact transition programs can have on improvement of patient and hospital outcomes. Ideally, a proposal should be presented that includes a schedule for reporting outcomes associated with the program on a regular basis. Anticipated operational efficiencies should be discussed and attempts to quantify new and retained patients in the health system should be undertaken. Because the cost of program development and implementation are likely to be an issue of administrative concern, program leaders should work with coding and reimbursement teams to evaluate opportunities for cost offsetting.

Depending on the structure of the program, transitional care management and chronic case management billing codes may be applicable (Medicare Learning Network: MLN 908628, 909188). Additionally, beginning in 2024, the Centers for Medicare and Medicaid Services (CMS) agreed to reimburse hospitals and/or providers for caregiver training services, SDOH risk assessments, principal illness navigation services, and community health integration services (Medicare Learning Network: MLN 9201074). Several of these services, such as collection of patient-level social risk factor information to link patients with community-based resources after discharge, are integral to robust stroke transitions of care programs and may now be billable to CMS when certain conditions are met.

Conclusions

Stroke programs are supported by clinicians that are uniquely qualified to create an innovative, robust stroke transitions program. The resources and publications outlined herein highlight newer models of post-discharge care and provide evidence to support the benefits of more timely and individualized post-discharge stroke care. Patients post-discharge needs are better served when health status and SDOH needs can be adequately assessed, and when attention is focused on health behaviors and factors affecting compliance with recommended recovery processes. When stroke clinicians have a better understanding of patient and caregiver needs and capabilities, and when the appropriate referrals and contacts are made to facilitate movement along the continuum of care, patient and stroke system outcomes will be improved. Building awareness among administrators and other key stakeholders in a manner that resonates with organizational
goals will be key in gaining approval to move forward.

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