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Octogenarians' post-acute care use after cardiac valve surgery and recovery: clinical implications

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Abstract

Octogenarians receiving cardiac valve surgery is increasing and recovery is challenging. Post-acute care (PAC) services assist with recovery, yet services provided in facilities do not provide adequate cardiac-focused care or long-term self-management support. The purpose of the paper was to report post-acute care discharge rates in octogenarians and propose clinical implications to improve PAC services. Using a 2003 Medicare Part A database, we studied post-acute care service use in octogenarians after cardiac valve surgery. We propose expansion of the Geriatric Cardiac Care model to include broader clinical therapy dynamics. The sample (n = 10,062) included patients over 80 years discharged from acute care following valve surgery. Post-acute care services were used by 68% of octagarians following cardiac valve surgery (1% intermediate rehabilitation, 35% skilled nursing facility, 32% home health). The large percentage of octagarians using PAC point to the importance of integrating geriatric cardiac care into post-acute services to optimize recovery outcomes.

Keywords

Octogenarians; Cardiac valve; Discharge planning; Geriatric cardiac care

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Introduction

Octogenarians are a rapidly growing segment of the United States population, and are projected to reach more than 25 million by the year 2050.¹ It is estimated that 40% of octogenarians suffer from symptomatic cardiac disease² that is complicated by multiple comorbidities, frailty, and disability. Many of these patients are referred for cardiac valve evaluation and undergo surgery. However, because of the complex issues associated with aging, recovery is extended and octogenarians face different problems post discharge than younger valve patients.

Following discharge, post-acute care (PAC) services are available and are delivered in intermediate rehabilitation facilities (IRF), skilled nursing facilities (SNF), or home health care (HHC). The majority of older adults over the age of 65 (51%) discharged from an acute-care setting following a cardiac event use PAC.³ Post-acute care services offer physical and occupational therapy and education for patients to improve activities of daily living (ADL) but typically do not emphasize cardiac disease management⁴ and/or intricacies of noncardiac management that impact cardiovascular recovery.

Self and family management are essential components for successful outcomes following PAC such as reduced re-hospitalizations and improved self-rated health.⁵ At discharge from acute care, patients are provided a list of activities that include medication management, diet and activity orders, and information on symptom management. For older adults, self-management is predictably complicated by polypharmacy, physical, psychological, and sensory limitations and reduced social and economic resources.⁶ Therefore, family management is often required to assist with self-management.

In cardiology, a model of geriatric cardiac care has been proposed that emphasizes a patient-centered approach, screening for coexisting geriatric syndromes and comorbidity, management of pharmacological regimens, and the emphasis on the importance of transitions of care.⁶ We propose expansion of this model to include family and self-management that addresses management of medications, diet, activity, and symptoms. Integrating the Geriatric Cardiac Care model into the services provided during the transition from hospital to home will contribute to successful outcomes following hospitalization for octogenarians after valve surgery.

The current paper provides a clear picture of PAC use in octogenarians after cardiac valve surgery by reporting the proportion of patients who are discharged to IRF, SNF, or home with HHC. Implications for clinical practice are provided that integrate geriatric cardiac care.

Methods

Secondary reporting using data from the 2003 Medicare Part A database (Medicare Provider Analysis and Review, MedPAR) and the Center for Medicare and Medicaid Denominator file was reported previously.³ The MedPAR is an administrative database that contains all Medicare-reimbursed inpatient hospital stays. This paper highlights the findings for octogenarians following cardiac valve surgery and the clinical implications. Though the data

are from 2003, the population of older adults continues to increase and more are receiving invasive surgeries like valve replacements. Furthermore, IRF still has the same requirements for admission today as it did in 2003. As our population continues to age with an increasing number of older adults needing and receiving cardiac surgery, PAC use must be taken into consideration when making healthcare decisions for type of treatment. This data provides a baseline for future comparisons of traditional valve replacement methods and the basis of additions to the Geriatric Cardiac Care model.⁶ The original study was determined to be exempt from the University Institutional Review Board.

Study population

The secondary report include Medicare beneficiaries 80 years of age and older who survived an incident hospitalization for cardiac valve surgery in 2003 (N = 10,062). Cardiac valve surgery was identified from the entire MEDPAR 2003 database according to the *International Classification of Diseases, Ninth Revision, Clinical Modification* diagnosis code. The original study population did not include patients enrolled in Medicare Managed Care as their primary health insurance was not available in the database. Beneficiaries were excluded if they were hospitalized for two or more cardiac events, or were 90 years of age and older and not receiving Medicare Part B (since these individuals are considered to be deceased). The last exclusion criterion was suggested by the Research Data Assistance Center for use in deleting invalid cases. Furthermore, disabled and end-stage renal patients were excluded since PAC use may have been related to these diseases and not the primary diagnosis.

Variables

The outcome variable, post-acute care type, was derived from the MedPAR database and categorized as (1) IRF, (2) SNF, and (3) HHC. Since this variable is not a billing-based field and MedPAR is designed for billing purposes, the PAC variable required validation prior to statistical analysis. This was done by matching a destination code with a hospital discharge date and subsequent PAC admission date. Matches were found for 96.4% of the records and those not validated were excluded from further analysis.

Statistical analysis

The original analysis included merging of the MedPAR and the denominator file using patient identifiers. Variables were examined using descriptive statistics and chi-square tests. Analyses were completed with SAS 9.1 for UNIX (SAS Institute Inc., Cary, NC). For this secondary analysis, descriptive statistics were compared.

Results

Overall, 68% of octogenarians after cardiac valve surgery used PAC. Types of PAC used following hospitalization for cardiac valve surgery in Medicare beneficiaries 80 years of age and older are displayed in Table 1. The proportion of patients discharged to SNF was 35.2% (n = 3540), but only 1% (n = 105) for IRF. Patients discharged home and home with HHC were 31.9% (n = 3210) and 31.9% (n = 3207), respectively.

Discussion

Sixty-eight percent of octogenarians used PAC after cardiac valve surgery. This proportion of PAC use after discharge from valve surgery in octogenarians is significantly higher compared to prior work on all people ages 65 and greater.³ Notable findings also included low use of IRF.

Octogenarians use PAC for several reasons. First, octogenarians typically have multiple comorbidities and disabilities that complicate or prolong a patient's surgery and compromise recovery. Also, this group is known to be more frail than younger patients, particularly among women.⁷ This could be the reason a disproportionate amount of women who used SNF services when compared to men. Furthermore, with increased need of assistance in activities of daily living, older persons may not have available family members to assist in care at home and; therefore, need a place to recover to return home independently. The original study reported that octogenarians after valve surgery were seven times more likely to be discharged to skilled nursing facilities.³ Future research is needed to determine why such a high percentage of patients need extensive services post-discharge.

Surprisingly, the number of octogenarians discharged to an IRF was extremely low at 1%. This low rate is most likely due to the lack of reimbursement from Medicare. Cardiac valve surgery is not a reimbursable diagnosis-related code for IRF services.⁸ In-patient rehabilitation facilities generally cost more than a SNF and provide intense rehabilitation therapy three times each day. Therefore, it seems likely that if a Medicare policy change was initiated, use of IRF would increase. More research is needed to determine the benefits of octogenarians' use of IRF programs to determine the benefits of this intensive rehabilitation.

After experiencing surgery, octogenarians typically face longer hospitalizations, increased resource use, and, in some studies, more than double face discharge to a SNF when compared with lower age groups.¹ While some assume that technical advances in valve repair and replacement may ease the challenges of post-acute care, the opposite is more likely. Indeed, surgical techniques are improving with generally better acute outcomes. Moreover, older patients are increasingly being referred for transcatheter aortic valve replacements or mitral clip repairs, which are generally better tolerated procedures than traditional valve surgery. However, such technical advances are serving to broaden accessibility of valve replacement and repairs to patients who previously were considered too frail, functionally impaired, or too medically complicated for these options. However, while many more are likely to survive the valve procedure, it is uncertain if they will yield true clinical benefit (e.g. longevity, function, quality of life) as a consequence thereafter. Future research is needed to determine PAC use for octogenarians who receive these less invasive procedures.

Clinical implications: expanding the paradigm of cardiac care for older adults

A model for Geriatric Cardiac Care was proposed by Forman et al. (2011)⁶ and is a useful model to guide the clinical implications for octogenarians following valve surgery (Table 2). The model includes a patient-centered approach, screening for coexisting geriatric syndromes, management of pharmacological regimens, and emphasizing the importance of

transitions of care. We propose the addition of family and self-management to the model that includes skills essential to patients' successful recovery such as medication management and diet.

A patient-centered approach is critical for octogenarians following valve surgery. Although clinicians are at times quick to refer patients for surgery, the need for PAC services after surgery may not have been considered. Because 68% of octogenarians after cardiac valve surgery use PAC services, it would be helpful for patients and families to understand the trajectory of recovery in order to prepare for what is likely a long-term process that involves formal (PAC) and informal (family support) resources. Providing this data would assist patients to make decisions prior to the surgery. Furthermore, encouraging participation in a prehabilitation program, while improving functional capacity,⁹ may aid in the understanding of chronic cardiac illnesses and valve surgery and improve patients' recovery.

Screening for coexisting geriatric syndromes and comorbidity is also essential for octogenarians following valve surgery. In current practice, assessing risk for surgery does not include noncardiac factors that have an impact on long-term recovery such as frailty status, functional capacity, quality of life, and management of multiple comorbidities. Screening for depression, frailty status, cognitive function, caregiver support and caregiver stress will assist with planning for post-acute care needs.⁶

Management of pharmacological treatments consists of monitoring for medication side effects, medication reconciliation, and improvement of communication between the cardiologist and post-acute care service provider. Medication side effects are common and include potential falls from nitrates, increased bleeding from antiplatelet therapy, and decreased functional capacity from beta blockers.¹⁰ Vigilant nursing care is needed to assess for these potential complications and coordinate the pharmacological management of patients. Once patients are discharged, family and self-management is crucial to monitor for side effects and complications of polypharmacy.

Attention to transitions of care is another key component for the care of octogenarians following valve surgery proposed by Forman et al. (2011).⁶ Providing anticipated-discharge education to patients early could potentially decrease PAC service use and better prepare patients for self-management tasks post-valve surgery. Discharge teaching should not just start at admission, but at patients' initial appointments prior to surgery. Providers must learn not only to provide effective communication to patients, but also to evaluate the patient's understanding of education. Including the family in the spectrum of care is key to successful recovery in the older cardiac valve surgery population.⁶ Many elderly valve surgery patients lean heavily on family members to help with care the first few weeks after discharge. These caregivers need as much education as the patient and adequate time to prepare for the home-going patient. A patient navigator program may be an effective solution for providing support and education to cardiac valve surgery patients and families during the transition from acute-care to PAC facilities. Typically, patient navigators are specially-trained individuals that not only help patients work through the healthcare system, but provide support and eliminate barriers for patients and families.¹¹ Having a patient navigator assist a patient through the transition to PAC and home would ensure the patient receives all

education, resources, and support needed after a cardiac valve surgery. Furthermore, cardiac rehabilitation is an evidence-based intervention improving functional capacity and quality of life, while reducing morbidity, mortality, hospital readmission rates, and health care costs.⁶ While cardiac rehabilitation is prescribed as standard of care for these patients, some estimate that only 10–40% of elderly patients actually attend cardiac rehabilitation.¹²

Self-management skills following cardiac valve surgery include heart healthy nutrition, increasing activities of daily living, gradually increasing exercise, managing post-surgery depression, participating in a cardiac rehabilitation program, medication management, fatigue management, wound care, daily weight and pulse check, pain control, and attending follow-up appointments.^{13,14} For elderly patients who require additional assistance from family to independently manage at home, this list truly becomes quite burdensome. The patient may not be provided enough education and skill assessment from the acute-care hospital prior to discharge if it is assumed that the patient will be receiving PAC. The patient may also not be receptive to or ready for discharge education when anticipating being discharged with PAC. Furthermore, once a patient is at a PAC facility, nurses, patient care aides, and other clinicians provide the majority of self-management activities and often do not include discharge education from the facility.⁴ As geriatric cardiology expands, the care of the octogenarian after valve surgery will be improved.¹⁵ Because the majority of octogenarians use PAC and there is evidence that family and self-management skills are not addressed in PAC, there is much opportunity for improvement.

Limitations

While the investigators of the current study acknowledge that the data are from 2003, the findings are still relevant as no one has previously published rates of PAC use after discharge in this elderly population receiving valve surgery. Rehabilitation still has the same requirements for admission today as it did in 2003. As our population continues to age with an increasing number of older adults needing and receiving cardiac surgery, PAC use must be taken into consideration when making healthcare decisions for type of treatment. Furthermore, in the case of valve surgery, there are other less invasive options available now for general use for eligible patients. These less invasive procedures should be highly considered in light of a patient's potential PAC use among other criteria, especially with higher competition for places in rehab and at SNFs and increased comorbidities and medication use. In 2003, these options were not yet available.

The data provide crucial baseline data for future research. The data were gathered from a large administrative database which does not include Medicare Managed Care enrollees. Therefore, exclusion of some use of services by older adults is evident. Moreover, variables from this administrative database are limited and do not include important clinical variables such as discharge education, complications, and physical function. Future research including patient-related variables, circumstance-related variables, type of valve surgery received, and physical frailty score will provide more insight into this population. Analyzing PAC use after other surgeries in older adults would also be useful to further management of this rising population.

Conclusions

This study has identified that the majority of octogenarians receive PAC service use after cardiac valve surgery and proposed the integration of a Geriatric Cardiac Care Model to guide PAC recovery considerations. Future research is needed that compares PAC service use of elderly patients who receive alternative less invasive valve procedures to the standard of care population. Research is needed to further describe the family and self-management discharge needs of this population. Understanding the use of PAC has the potential to improve outcomes for octogenarians after cardiac valve surgery.

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Table 1

Post-acute care service use in octogenarians.

PAC Service	Total N (%)
Skilled Nursing Facility	3540 (35)
Intermediate Rehabilitation Facility	105 (1)
Home Health Care	3207 (32)
Home	3210 (32)

Table 2

Modified paradigm of cardiac care in older adults.^a

Modified Paradigm of Cardiac Care in Older Adults	
1. Emphasize patient-centered approach to care	
<ul style="list-style-type: none"> ● Develop tools to assess cardiovascular risk in the context of aggregate age-related risk ○ Develop tools to determine realistic goals in the context of each patient's overall health circumstances ■ Incorporate noncardiac comorbidity, functional capacity, and quality-of-life factors into risk-benefit assessment of care options ○ Incorporate patient preferences into care plan <ul style="list-style-type: none"> ■ Assessment of end-of-life preferences, including development of advance directives, designation of durable power of attorney for health care, and (if appropriate) discussion of palliative care options ● Assess utility of diagnostic testing relative to overall treatment goals 	
2. Screen for coexisting geriatric syndromes and comorbidity (e.g., cognitive function, disability, and frailty in patients)	
<ul style="list-style-type: none"> ● Incorporate standardized geriatric tools (e.g., gait speed, "get up and go" test, Mini-Mental State Examination, and so on) ● 75 years of age Screen for depression and/or anxiety ● Screen for caregiver stress, home support 	
3. Purposefully manage pharmacological regimen	
<ul style="list-style-type: none"> ● Adapt dosing regimen and targets of therapy emphasizing tolerability and affordability <ul style="list-style-type: none"> ○ Use weight- and renal-adjusted dosing (if appropriate) ○ Focus on potential drug–drug and drug–disease interactions ○ Assess relative risk and benefit of additional medications ○ Utilize services of a geriatric pharmacist (if available) ● Increase vigilance for drug side effects/intolerance <ul style="list-style-type: none"> ○ Enlist assistance of care providers ○ Reconcile medication during all care encounters (particularly following care transitions) ● Simplify medication regimen if possible ("unprescribe") <ul style="list-style-type: none"> ○ Ensure provision of tools (e.g., pillboxes, written instructions) 	
4. Emphasize the importance of transitions of care	
<ul style="list-style-type: none"> ● Improve methods of communications among caregivers and with patients; plan for collaborative follow-up and assessment to prevent gaps or overlaps in care delivery <ul style="list-style-type: none"> ○ Use nurse clinicians or pharmacists to provide added support ○ Ensure transparency in care across providers through more effective utilization of electronic medical records and traditional methods of correspondence ○ Create a central repository listing all medications, doses, and frequencies ○ Provide clear contact information for all patients when questions arise. 	

Modified Paradigm of Cardiac Care in Older Adults	
5. Providing family and self-management interventions	● Provide patient education designed to promote self-care behaviors and foster adherence to medications, diet, activity recommendations, and other health-promoting behaviors
	● Make greater utilization of rehabilitation services, including facility- and home-based programs, as well as greater utilization of home health services, including home monitoring
	● Start discharge education with patient and family at initial appointment and potential need for post-acute care
	● Ensure patient and family understanding of medication management, heart healthy nutrition, post-surgery depression management, fatigue management, wound care, symptom management, and pain control
	● Emphasize the importance of attending a cardiac rehabilitation program to increase functional capacity and quality of life

^aThis table is a modification of Forman et al.'s original Geriatric Cardiac Care Model.⁶