

CLINICAL INVESTIGATION

THE REHABILITATION OF GERIATRIC PATIENTS ON HEMODIALYSIS: A CASE SERIES

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Background: Rehabilitation of geriatric patients on hemodialysis has not been well studied. Concerns about the outcomes of hemodialysis patients on the Geriatric Inpatient Unit of the Southeastern Ontario Regional Geriatric Program prompted a review of rehabilitation admissions for this population.

Methods: The charts of hemodialysis patients were retrospectively reviewed. Information extracted included function and mobility at admission and discharge, MMSE, Charlson Index, and patients' discharge goals and disposition.

Results: 5 hemodialysis patients were reviewed. Mean age was 76.4 years. All were admitted soon after acute care admission for acute illness. Only 1 patient had been on hemodialysis for >1 year. The median Charlson Index was 10 (range 7-11). All patients cited a goal of returning home, but only 1 patient reached that goal. The remaining patients were discharged to long-term care, complex continuing care and a retirement home. All of the patients discharged to institutions died within 6 months of discharge. All patients except for 1 made gains in mobility and activities of daily living, but the patients had difficulty maintaining gains to reach their discharge goals.

Conclusion: Older hemodialysis patients had poor rehabilitation outcomes in this case series. Factors related to the outcomes may include duration of dialysis, medical instability, and scheduling of dialysis times.

Key words: Geriatric rehabilitation, outcome, hemodialysis

INTRODUCTION

In the last 10 years, the use of hemodialysis in the frail elderly population has increased tremendously. In 1999, for the first time, 50% of new dialysis patients were >65 years old.¹ The relative rate of increase in patients >75 years between 1981 and 1999 has been 691%, compared with 91% over the same period for patients 45-64 years old. This population frequently has significant comorbidities in addition to end stage renal disease (ESRD). When elderly patients receiving hemodialysis are admit-

ted for an acute illness, they may become deconditioned and lose function. In order to assist patients' return to their previous level of function and living situation, consultation by a geriatric rehabilitation service is often considered.

The effectiveness of physical rehabilitation of frail elderly dialysis patients has not been well studied. The mortality of patients starting dialysis late in life increases dramatically as age of initiation increases.² Likewise, patient estimates of their own function after starting dialysis have been shown to decline.^{3,4} In a prospective study of 45 ESRD patients admitted to an inpatient rehabilitation program (62% of subjects were on dialysis), the ESRD patients appeared to improve their function to a similar degree as patients without renal disease, but tended to be discharged with a lower Functional Independence Measure score (FIM).⁵ A similar percentage of ESRD patients were discharged home compared with controls (89% with ESRD vs 87% without ESRD). The mean age of subjects with ESRD was 61.5 years (SD 12.2).

No prospective or retrospective studies of physical rehabilitation of geriatric patients on hemodialysis were identified using a Medline search. Concerns were identified about the barriers to rehabilitation experienced by dialysis patients on the Geriatric Inpatient Unit of the Southeastern Ontario Regional Geriatric Program. The purpose of this case series was to retrospectively review the experience of hemodialysis patients undergoing geriatric rehabilitation.

PATIENTS AND METHODS

The Geriatric Inpatient Unit (GIU) at St. Mary's of the Lake Hospital in Kingston is a 16-bed unit for the assessment and rehabilitation of frail elderly patients. There are approximately 120 admissions

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per year with an average age of 83. Approximately 50% of admissions are transfers from an acute care hospital (Kingston General Hospital, KGH) for rehabilitation after acute illness. The average length of stay in 2001 was 28 days.

A review of intake information on all admissions to the GIU since 1995 identified patients receiving hemodialysis. One of the authors (CF) reviewed the charts of all patients participating in geriatric rehabilitation while on hemodialysis, using a standardized data extraction form. The information extracted included demographic information, location before admission, and reason for renal failure and for the admission to the acute care hospital. Patients' discharge goals were identified from the geriatric team multidisciplinary conference documentation. Mobility on admission and discharge was assessed using the Berg balance score, and using the physiotherapy assessment of mobility and assistive device use. Independence in Activities of Daily Living was extracted from Occupational Therapy assessment of dressing, feeding, bathing and toileting requirements. Score on the Mini-Mental State Examination (MMSE) was documented from the admission note or the acute care geriatric consult team assessment, where available. The Charlson Index was used to review non-renal factors possibly relating to rehabilitation potential. The patient's discharge disposition was documented.

Statistical analysis was done using SPSS software. Statistics were descriptive (means \pm SD of MMSE, Charlson Index, percentages of subjects reaching discharge goal). Ethics approval was granted by Queen's University Research Ethics Board.

RESULTS

Five hemodialysis patients who were admitted to St. Mary's of the Lake for geriatric rehabilitation were identified by the review of intake information. The mean age of subjects was 76.4 (SD 5.9). All but one patient were transferred from an acute care hospital (Kingston General Hospital) for rehabilitation after illness. Four of the five subjects were living independently before admission, and the patient admitted from long-term care had recently been discharged there after a 4-month admission to KGH. All subjects identified their primary goal of geriatric rehabilitation being to return home to community living. The demographic and background information on subjects is summarized in Table 1.

Baseline cognitive testing was done in 3/5 subjects. The reason the test was not administered to the remaining two subjects was that the geriatric consult team and the admitting team noted no cognitive deficits. The mean MMSE for the other subjects was 21.7/30. The median Charlson Index score for these patients was 10 (range 7-11).

Subjects generally made gains in their mobility and balance during the admission. These improvements are summarized in Table 2. At admission, 4/5 subjects did not need maximal assistance with activities of daily living, and improvements over the course of rehabilitation are seen in Table 3.

Only one person (subject 1) was medically and functionally able to meet the goal of returning home to independent living. One patient (subject 4) was discharged to a retirement home but died 1 month later. Two patients (subjects 2 and 3) were transferred to complex continuing care, and both died

Table 1. Summary of patient characteristics

Patient	Age	Cause of renal failure	Duration of dialysis	Cause of acute care admission	Location PTA	Charlson Index
1	82	AAA repair	>4 years	Fall 2° ADR to pamidronate	Home	8
2	76	pyelonephritis	1 month	Pyelonephritis/ARF	Home	10
3	67	pyelonephritis	4 months	Urosepsis	Home	7
4	81	Cholesterol emboli with CABG	5 months	Line sepsis	Home (Seniors Apartment)	11
5	76	? nephrotoxic meds	7 months	Admitted from nursing home after 4-month KGH admission	Nursing home	10

PTA=prior to admission; ADR=adverse drug reaction; ARF=acute renal failure

Table 2. Changes in mobility from admission to discharge

Patient	Berg balance scores (admission → discharge)	Mobility (admission → discharge)	Assistive device
1	24/56 → 34/56	36 m assist of 1 → 110 m independently	4-wheeled walker
2	5/56 → not available due to illness	8 m minimal assist → 20 m with supervision transfer 1 person moderate assist → 1 person minimal assist	4-wheeled walker
3	35/56 → 41/56	70 m independent → >100 m independent -independent transfer	4-wheeled walker
4	37/56 → 40/56	100 m 1 person assist on dialysis days → 11m 1 person assist dialysis days -transfer independent	4-wheeled walker
5	4/56 → 4/56	Steps in parallel bars → steps in parallel bars with 2 person assist -lift transfer	N/A

N/A=not applicable

within 1 month. The final subject (5) was discharged back to the nursing home, where he died 3 months later.

DISCUSSION

This retrospective case series was undertaken because of concerns about the outcome of geriatric rehabilitation with older hemodialysis patients. In this series only one of the patients met their goal of discharge to home or to their previous independent level of care. The subject who did return home was the only person who had been on dialysis for an extended period of time. Four of the five subjects had been on dialysis <8 months and experienced

ongoing medical issues related to dialysis and their underlying renal disease.

Despite recent illness and fairly long hospitalizations at acute care before transfer for rehabilitation, subjects were not significantly dependent in function at time of admission. Most were mobile at least for short distances and most required mild to moderate assistance with activities of daily living. With the exception of the most functionally impaired patient, all subjects made measurable gains with rehabilitation but could not make enough gains or could not maintain their function when periods of medical instability occurred. Most were also noted to have significant fluctuation of function related to timing of dialysis, requiring more assistance imme-

Table 3. Changes in patients' Activities of Daily Living from admission to discharge

Patient	Dressing (admission → discharge)	Bathing (admission → discharge)	Toileting (admission → discharge)	Discharge destination
1	Assist → independent	Assist → assist	Independent → independent	Home
2	Assist → assist	Assist → assist	Assist → assist	Complex Continuing Care
3	Independent	Assist → assist	Assist → independent	Complex Continuing Care
4	Independent	Independent	Independent	Retirement Home
5	Dependent	Dependent	Dependent	Nursing Home

diately before or after the dialysis. In addition, even when dialysis days were moved to include a weekend, subjects still missed significant amounts of therapy going to dialysis or recovering from the effects of treatment.

Four of five patients died within 3 months of discharge from the Geriatric Inpatient Unit. This reflects poorer survival rates for patients initiating dialysis late in life, particularly in patients over age 80.² In our series, all patients had significant comorbidities. Charlson comorbidity index scores were in the very high category (≥ 8) in all but one patient. Survival on dialysis in this category was approximately 30% at 2 years in a study by Beddhu and colleagues.⁶

The outcomes of this small series are less positive than with Cowen's study in a younger population. In their prospective study, hemodialysis patients with a mean age of 61 made comparable gains to patients without ESRD. However, a significant proportion of their subjects had not been admitted to rehabilitation for reconditioning due to acute illness. Without formal physical rehabilitation services, maintenance hemodialysis has not been shown to improve function in older patients.³ Diabetic patients appear to be at great risk of functional decline despite treatment of ESRD with dialysis.⁷ Specific exercise and therapy programs have been shown to improve mobility and some aspects of general function in patients with ESRD.⁸⁻¹⁰ The patients in this series were somewhat different in that they needed the rehabilitation to recover from a discrete illness in addition to their ESRD and hemodialysis.

This case series has limitations. The number of patients is small, reflecting the reluctance of the consultant geriatrician to accept hemodialysis patients into the geriatric rehabilitation program. The series was retrospective, which limited the measures of functional gain that we used. A prospective study in this population would be relevant but would need to be multi-centred to overcome small numbers of patients at a single site. We made no effort to measure quality of life, because this was not documented on patients' charts. As with any rehabilitation study, this would be an

Rehabilitation of Geriatrics Patients on Hemodialysis important outcome to measure in this population where quality of life can be significantly affected.¹¹

CONCLUSION

This case series found a poor outcome for 5 hemodialysis patients participating in a geriatric rehabilitation program. Factors that may relate to limited success with rehabilitation include duration of dialysis, medical instability, the impact of dialysis scheduling on participation in therapy, and the effect of dialysis on patient well-being and ability to actively participate in the rehabilitation program. A larger prospective study would be necessary to clarify the relationship between these factors and rehabilitation outcomes.

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