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Case Report

How Inpatient Rehabilitation Transformed a Geriatric Male with Severe Frailty and Depression: A Case Report

Rehabilitasi Rawat Inap Menyembuhkan Pria Lansia dengan Kelemahan Berat dan Depresi: Laporan Kasus

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Abstract

Frailty, sarcopenia, and depression are interconnected geriatric syndromes that worsen functional decline and quality of life. Previous literature has mainly focused on single-domain interventions, while reports on multidomain inpatient rehabilitation in severely frail elderly patients with recurrent pneumonia remain scarce. This case report aimed to evaluate the benefits of a multidomain inpatient rehabilitation program on physical and mental recovery in a geriatric patient with severe frailty, depression, and recurrent pneumonia. This case report describes a 72-year-old male with de Morton Mobility Index (DEMMI) 0, Strength, Assistance with walking, Rising from a chair, Climbing stairs, Falls (SARC-F) 8, Clinical Frailty Scale (CFS) 7, and Geriatric Depression Scale (GDS) 11 who underwent twice-daily cardiopulmonary endurance training using arm ergometer cycling for 20 minutes (0 watts, 30–40 RPM) with gradual increments, combined with Cognitive Behavioral Therapy (CBT) and progressive mobilization exercises. After two weeks, the patient showed meaningful improvements: DEMMI increased to 8, GDS decreased to 8, SARC-F improved, and bronchopneumonia resolved, while sarcopenia remained stable. Comprehensive rehabilitation combining aerobic exercise, CBT, and mobilization exercises effectively improves mobility, mood, and frailty in geriatric patients. In conclusion, multidisciplinary approaches are important for managing complex geriatric conditions.

Keywords: *depression; frailty; geriatric rehabilitation; sarcopenia*

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Abstrak

Kerapuhan, sarkopenia, dan depresi merupakan sindrom geriatri yang saling terkait dan memperburuk penurunan fungsi serta kualitas hidup. Literatur sebelumnya sebagian besar berfokus pada intervensi domain tunggal, sementara laporan rehabilitasi rawat inap multidomain pada pasien lanjut usia yang sangat rapuh dengan pneumonia berulang masih terbatas. Laporan kasus ini bertujuan untuk mengevaluasi manfaat program rehabilitasi rawat inap multidomain terhadap pemulihan fisik dan mental pada pasien geriatri dengan kerapuhan berat, depresi, dan pneumonia berulang. Laporan kasus ini menggambarkan seorang pria berusia 72 tahun dengan *de Morton Mobility Index* (DEMMI) 0, *Strength, Assistance with walking, Rising from a chair, Climbing stairs, and Falls* (SARC-F) 8, *Clinical Frailty Scale* CFS 7, dan *Geriatric Depression Scale* (GDS) 11 yang menjalani latihan ketahanan kardiopulmoner dua kali sehari menggunakan ergometer lengan selama 20 menit (0 watt, 30–40 RPM) dengan peningkatan bertahap, dikombinasikan dengan Terapi Perilaku Kognitif (TPK) dan latihan mobilisasi progresif. Setelah dua minggu, pasien menunjukkan perbaikan yang signifikan: DEMMI meningkat menjadi 8, GDS menurun menjadi 8, SARC-F membaik, dan bronkopneumonia membaik, sementara sarkopenia tetap stabil. Rehabilitasi komprehensif yang menggabungkan latihan aerobik, TPK, dan latihan mobilisasi efektif meningkatkan mobilitas, suasana hati, dan kerapuhan pada pasien geriatri. Simpulan, pendekatan multidisiplin penting untuk menangani kondisi geriatri yang kompleks.

Kata kunci: depresi; kerapuhan; rehabilitasi geriatri; sarkopenia

Introduction

Frailty and depression are common among geriatric patients, often contributing to reduced mobility, increased dependency, and a diminished quality of life. These conditions can be further worsened by sarcopenia, which leads to physical limitations by reducing muscle strength, balance, and endurance. Comprehensive, tailored rehabilitation programs play a crucial role in restoring function and well-being in geriatric patients.[1–3]

Previous research has underscored that frail older adults admitted to acute care settings frequently experience only limited functional recovery. Chang et al. demonstrated that within an Acute Care for Elders (ACE) unit, frail and pre-frail patients achieved some improvement in Activities of Daily Living (ADL) during hospitalization. However, their recovery remained markedly inferior compared with robust counterparts. This establishes frailty as a strong predictor of poor clinical outcomes in geriatric inpatients. These findings reveal an important gap in the literature. While inpatient programs can support functional gains, there is a paucity of evidence regarding comprehensive, multidomain rehabilitation strategies specifically designed for severely frail patients who also present with depression and recurrent pneumonia. To address this gap, we present a case report of a 72-year-old male with severe frailty and comorbid conditions, who demonstrated remarkable improvement through a structured inpatient rehabilitation program. This case highlights the potential benefits of individualized,

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multidomain rehabilitation in optimizing both physical and psychological outcomes in complex geriatric populations.[4]

Case Description

A 72-year-old male was admitted to the hospital with recurrent bouts of pneumonia. Upon arrival, the patient was in a fragile state, extremely frail, and unable to move independently. Simple tasks, such as sitting up or turning over in bed, could not be performed, and assistance was required for almost all actions.

Emotionally, the patient was devastated and expressed feelings of hopelessness. The burden of depression made it even more difficult to envision recovery. The lack of motivation and belief in the ability to improve created a barrier to healing and led to a profound sense of isolation, both physically and mentally.

A head CT scan showed lacunar infarctions in the left internal capsule region and right thalamus, multiple lacunar infarcts in the pons region, senile cerebral atrophy, and atherosclerosis of the left vertebral and basilar arteries. A chest X-ray showed bilateral pneumonia.

The patient was hospitalized with recurrent pneumonia and geriatric syndrome, including immobility, isolation, instability, inactivity, infection, insomnia, frailty, sarcopenia, and depression. Prolonged bed rest before admission had further exacerbated the condition.

Upon admission, the height and weight were 170 cm and 60 kg, respectively. All vital signs were normal, including blood pressure: 136/73 mmHg, heart rate: 97 beats/min (regular), respiratory rate: 22 breaths/min, and percutaneous arterial oxygen saturation: 99% on nasal cannula oxygen at 2 L/min. An assessment of lung sounds showed secretions in the medial bilateral lungs. Additionally, the patient was hemiplegic on the left side, with muscle power graded as 4 on the right side.

The Geriatric Depression Scale (GDS) showed depression with a score of 11. The Clinical Frailty Scale scored 7 (severely frail), and the de Morton Mobility Index (DEMMI) score was 0, showing mobility. The Asian Working Group of Sarcopenia (AWGSOP) and SARC-F scores were 8, suggesting sarcopenia.

The rehabilitation program was designed to restore mobility and improve both ADL and mood. The patient underwent cardiopulmonary endurance training using an arm ergometer, performed twice daily for 20 minutes, with an initial workload of 0 watts and 30–40 Revolutions Per Minute (RPM). The workload was gradually increased based on tolerance. Vital signs and physical responses were monitored following each session. Complementary

mobilization exercises were initiated, beginning with elevation of the head of the bed to improve upright tolerance. Over the subsequent two weeks, the program advanced to edge-of-bed sitting, enabling muscle strengthening, postural stabilization, and adaptation to positional changes. Clinical outcomes were notable: the de Morton Mobility Index (DEMMI) score improved from 0 to 8, bronchopneumonia resolved on serial chest radiographs, the SARC-F score decreased from 8 to 7, and the Geriatric Depression Scale (GDS) score declined from 11 to 8. Written informed consent was obtained from the patient for publication of this case report.

Discussion

This case showed how a comprehensive and personalized inpatient rehabilitation program can transform the life of a severely frail and depressed older adult. The patient arrived at the Hasan Sadikin General Hospital, Bandung, Indonesia, in a devastating condition, physically too weak to move and emotionally burdened by hopelessness.

Elderly encounter numerous challenges associated with physical and psychological changes. Among these, frailty and depression are common geriatric syndromes that increase the risk of disability.[3,5] Elderly often experience infections that lead to mortality, and one of the major causes of this problem is pneumonia.[6,7] The condition has been reported in several cases, accompanying 30% of the elderly with stroke. It has a high recurrence risk, specifically in males, the elderly, and the presence of dysphagia.[8,9]

Sarcopenia and frailty have become barriers for the elderly to mobilize. It happens due to a progressive decline in muscle mass, strength, and function, which directly impairs physical performance. This patient showed severe frailty and sarcopenia, a clinical frailty scale score of 7, as well as AWGSOP and SARC-F scores of 8. These conditions made the patient unable to perform even basic movements, including sitting up, as well as the ability to rebuild strength and endurance. The patient was unable to perform basic movements, leading to a DEMMI score of 0. The DEMMI score was 0 due to acute stroke caused by hemiplegia, loss of balance, and impaired motor coordination, while frailty limited mobility by reducing muscle strength. Depression reduces motivation and energy, leading to inactivity, worsening physical impairments, and increasing dependency on a caregiver.[1,10]

In sarcopenia, the loss of muscle strength reduces the ability to perform fundamental movements such as standing and walking. This condition is also associated with the incidence of frailty in sarcopenic patients, which further accelerates physical deterioration. These conditions also disrupt neuromuscular coordination, leading to slower gait speed and poor balance, which discourages independent movement. Moreover, inflammation or infection and inadequate

protein intake exacerbate muscle degradation. As sarcopenia progresses, mobility impairment contributes to a vicious cycle of physical inactivity, further accelerating muscle loss and functional decline.[7,11–13]

Furthermore, depression deteriorated the condition as reflected in the GDS score of 11. The elderly with depression are more likely to experience frailty, which can both lead to the onset of new depressive episodes and perpetuate existing frailty. This combination of physical and emotional frailty creates a cycle of inactivity and hopelessness.[2,14]

Many studies have reported that sarcopenia can contribute to depression in elderly individuals due to several interconnected physiological and psychological mechanisms. The impaired mobility that happens due to sarcopenia increases the risk of physical disability, social isolation, and loss of independence. This reduction in physical function can lead to emotional distress and a sense of helplessness, increasing vulnerability to depression. The chronic low-grade inflammation and hormonal dysregulation in sarcopenic patients, particularly a decrease in Brain-Derived Neurotrophic Factor (BDNF), which plays a crucial role in mood regulation and cognitive function. There was also a bidirectional relationship between sarcopenia and depression, leading to further decline and a higher risk of adverse health outcomes.[2,15,16]

After two weeks of rehabilitation, mobility improved (DEMMI score from 0 to 8), bronchopneumonia improved, frailty improved (SARC-F from 8 to 7), no worsening of sarcopenia, and GDS increased from 11 to 8. Several studies proved that multi-domain rehabilitation, including cardiopulmonary endurance training and CBT, improved frailty and depression, including well-being status.[17–19]

Cardiopulmonary endurance exercise helps reduce frailty by enhancing heart and lung function, which improves oxygen delivery and energy levels. It also strengthens muscles, enhances balance and mobility, and lowers the risk of falls. Regular aerobic exercise can reduce chronic inflammation, a common issue in frailty, and improve the production as well as use of energy. Beyond the physical benefits, it positively impacts mental health by easing depression, anxiety, and cognitive decline. The physical improvements restore the ability to perform daily activities, fostering a sense of independence and reducing feelings of helplessness associated with sarcopenia. The exercise-induced endorphin was released and counteracted depressive symptoms. The social aspects of rehabilitation, such as group exercise sessions and caregiver support, also contribute to improved mental well-being by reducing loneliness and increasing motivation. Altogether, these changes help individuals feel stronger, more energetic, and better equipped to handle daily activities, improving overall quality of life.[2,17,20,21]

Our findings are in line with prior research showing that multidomain interventions can improve physical and psychological outcomes in frail older adults. For example, Chang et al.[4]

demonstrated that frail and pre-frail patients in an ACE unit showed improvements in ADL during hospitalization, although their recovery remained significantly lower compared with robust patients, indicating that frailty is a strong predictor of poor clinical outcomes. Similarly, Chen et al.[17] reported that community-based multidomain interventions—comprising physical exercise, cognitive training, nutritional counseling, and disease education—were effective in reducing frailty, malnutrition, and depressive symptoms, while also improving cognitive performance, particularly among participants aged ≥75 years.[4,17]

Despite these similarities, our case differs in several critical aspects. First, both Chang et al. and Chen et al. focused largely on prefrail and frail community-dwelling elders or general inpatient geriatric populations, whereas our patient presented with severe frailty (CFS 7), sarcopenia, recurrent pneumonia, and depression, representing a much higher level of clinical complexity. Second, the interventions previously reported emphasized group-based and preventive approaches, often requiring several months to achieve measurable outcomes. In contrast, our inpatient program integrated cardiopulmonary endurance training (arm ergometer cycling), Cognitive Behavioural Therapy (CBT), and mobilization exercises, achieving meaningful physical, psychological, and clinical recovery within only two weeks. Third, while Chen et al. highlighted empowerment and long-term adherence as crucial for sustaining benefits, our report demonstrates that even a short-term, highly individualized inpatient program can yield rapid improvements in patients with multiple comorbidities.[4,17]

The short duration of the rehabilitation program limited this study, making it unclear whether the improvements in mobility, frailty, and depression will last long-term. Incorporating a control group in future studies would provide stronger evidence for the effectiveness of combining cardiopulmonary endurance training and CBT in treating frailty and depression in elderly patients.

Conclusion

In conclusion, this case report showed that a comprehensive inpatient rehabilitation program significantly improved the life of a severely frail and depressed elderly male. By using a combination of endurance training, mobilization exercises, and CBT, the patient experienced remarkable progress in two weeks, regaining mobility, reducing frailty, and improving mood. This underscores the importance of personalized, holistic care in helping the elderly overcome both physical and emotional challenges, ultimately restoring independence and quality of life.

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