



Holistic Management of Dyslipidemia in a Geriatric Patient with Comorbid Hypertension and History of Hyperuricemia Following Lower Extremity Trauma

Muhammad Hatta¹, Agustina Hadjar², Muhammad Iqbal Pratama², Muhammad Irham Fadil Al Muhsin², Muhammad Yusuf Al Afif^{2*}, Muhammad Zaidan Afkar², Mutiara Salsabila²

¹ Faculty of Medicine, Malahayati University Bandar Lampung, Indonesia

² Medical Study Program, Malahayati University Bandar Lampung, Indonesia

* Correspondence: yusufndc08@gmail.com

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Abstract

Dyslipidemia is a major metabolic disorder and a key risk factor for atherosclerotic cardiovascular disease (ASCVD), particularly in the geriatric population. Elderly patients frequently present with multiple comorbidities, such as hypertension and hyperuricemia, which complicate clinical management and substantially increase cardiovascular risk. Moreover, acute conditions, including trauma-related injuries, may further disrupt metabolic control, functional capacity, and adherence to long-term therapy. This case report describes a 70-year-old male patient (RE) who presented to a primary healthcare center with swelling and intermittent pain in the right lower extremity following a fall. The patient had a known history of dyslipidemia, hypertension, and hyperuricemia. Laboratory investigations revealed elevated total cholesterol (242 mg/dL), borderline fasting plasma glucose (102 mg/dL), and uric acid level of 6.6 mg/dL. Physical examination was unremarkable except for edema and localized tenderness in the affected limb, consistent with a soft tissue injury. A holistic management approach was implemented, integrating pharmacological and non-pharmacological interventions. Statin therapy was initiated to address dyslipidemia, antihypertensive treatment was optimized, and analgesic therapy combined with limb elevation was provided to manage acute pain and edema. Non-pharmacological strategies included comprehensive lifestyle modification, encompassing dietary counseling (low saturated fat, low salt, and low purine diet), gradual resumption of physical activity following injury recovery, and structured patient-family education to improve adherence and prevent recurrent falls. Follow-up evaluation demonstrated clinical improvement, including resolution of edema, improved functional mobility, and better metabolic control. The novelty of this case lies in demonstrating how acute trauma in geriatric patients can act as a critical entry point for integrated chronic disease management within primary care settings. This case emphasizes that holistic, biopsychosocial-spiritual management not only improves lipid and blood pressure control but also enhances functional outcomes and quality of life in elderly patients with complex comorbidities.



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1. Introduction

Dyslipidemia is a disorder of lipid metabolism characterized by abnormal plasma lipid levels, including elevated total cholesterol, low-density lipoprotein cholesterol (LDL-C), triglycerides, or reduced high-density lipoprotein cholesterol (HDL-C). It is widely recognized as one of the most important modifiable risk factors for atherosclerotic cardiovascular disease (ASCVD), encompassing coronary artery disease, cerebrovascular disease, and peripheral arterial disease. The global burden of ASCVD remains substantial and continues to increase, particularly among aging populations, making dyslipidemia a critical public health concern worldwide (Egan et al., 2024; Ulpathakumbura et al., 2026; Zhao et al., 2026).

Epidemiological studies consistently demonstrate that the prevalence of dyslipidemia increases with advancing age. Age-related physiological changes, such as reduced hepatic lipid clearance, altered hormonal regulation, increased insulin resistance, and decreased physical activity, contribute to unfavorable lipid profiles in elderly individuals. In addition, cumulative exposure to unhealthy lifestyle behaviors, including diets high in saturated fats, sedentary habits, and smoking, further exacerbates lipid abnormalities in older adults. Consequently, dyslipidemia in geriatric populations often represents a chronic and progressive condition requiring long-term management (Zhou et al., 2026).

In clinical practice, dyslipidemia in elderly patients rarely presents as an isolated disorder. It frequently coexists with other metabolic and cardiovascular conditions, most notably hypertension, diabetes mellitus, and hyperuricemia. The clustering of these conditions reflects shared pathophysiological mechanisms, including endothelial dysfunction, chronic low-grade inflammation, oxidative stress, and dysregulation of metabolic pathways. This constellation of disorders significantly amplifies the risk of ASCVD and complicates clinical decision-making, particularly in primary care settings (Slee et al., 2026; W. Wang et al., 2026).

Hypertension is one of the most prevalent comorbidities associated with dyslipidemia in older adults. Elevated blood pressure and abnormal lipid levels interact synergistically to accelerate atherosclerotic plaque formation, promote vascular stiffness, and impair endothelial function. In elderly patients, prolonged exposure to both conditions substantially increases the risk of myocardial infarction, stroke, and heart failure. Effective management therefore requires simultaneous control of both lipid and blood pressure parameters rather than isolated treatment of individual risk factors (Lin et al., 2025; Tsai et al., 2025).

Hyperuricemia has also gained increasing attention as a metabolic abnormality closely associated with dyslipidemia and hypertension. Elevated serum uric acid levels have been linked to endothelial dysfunction, activation of inflammatory pathways, and increased oxidative stress, all of which contribute to cardiovascular disease progression. Although hyperuricemia is traditionally associated with gout, growing evidence suggests that it plays an independent role in cardiovascular risk stratification, particularly in elderly patients with multiple metabolic comorbidities (Chen et al., 2025; Lien et al., 2025).

The coexistence of dyslipidemia, hypertension, and hyperuricemia poses significant challenges in geriatric care. Elderly patients often have reduced physiological reserve, altered pharmacokinetics, and increased susceptibility to adverse drug reactions. Polypharmacy is common in this population and increases the risk of drug–drug interactions, non-adherence, and medication-related complications. As a result, treatment strategies must be carefully individualized, balancing therapeutic benefits against potential risks (Cannizzaro & Spessotto, 2025; Ding et al., 2025; Garg et al., 2025).

In addition to chronic metabolic conditions, geriatric patients are particularly vulnerable to acute health events, such as falls and trauma. Age-related decline in muscle strength, balance, proprioception, and visual acuity significantly increases fall risk. Falls represent a major cause of morbidity in older adults and often result in soft tissue injuries, fractures, reduced mobility, and loss of independence. These acute events may have far-reaching consequences beyond the immediate injury (Al et al., 2025; Hoyek et al., 2025).

Trauma-related injuries in elderly patients can exacerbate underlying chronic conditions, including dyslipidemia and hypertension. Pain, reduced mobility, and fear of falling may lead to prolonged physical inactivity, which adversely affects lipid metabolism and blood pressure control. Furthermore, acute pain and psychological distress following trauma can interfere with adherence to chronic medication regimens and recommended lifestyle modifications (J. Wang et al., 2025). The interaction between acute injury and chronic metabolic disease highlights the limitations of a purely disease-centered or organ-specific approach to geriatric care. Managing dyslipidemia in elderly patients cannot be confined to lipid-lowering pharmacotherapy alone. Instead, it requires a comprehensive and holistic approach that addresses the complex interplay between biological, psychological, social, and spiritual factors influencing health outcomes (Mandolesi et al., 2025).

Holistic medicine emphasizes the integration of biomedical treatment with psychosocial and behavioral interventions. In geriatric patients, psychological factors such as anxiety, depression, or fear of falling may significantly influence treatment adherence and functional recovery. Social factors, including family support, caregiving capacity, and access to healthcare services, play a critical role in sustaining long-term disease control. Spiritual beliefs and values may further shape patients' perceptions of illness, coping mechanisms, and motivation to engage in lifestyle changes (Fischman et al., 2025; Peng et al., 2025; Terrin et al., 2025).

Family involvement is particularly important in the management of elderly patients with chronic diseases. Family members often assist with medication administration, dietary planning, mobility support, and monitoring of clinical symptoms. Adequate family support has been associated with improved adherence, better functional outcomes, and enhanced quality of life among elderly patients. Therefore, family-centered care is an essential component of holistic geriatric management (Borah et al., 2023; Khandelwal et al., 2024; Suralaga & Usman, 2025). Primary healthcare centers are strategically positioned to implement holistic and continuous care for elderly patients with complex health needs. As the first point of contact within the healthcare system, primary care providers play a pivotal role in early detection of dyslipidemia, risk stratification, coordination of care, and long-term follow-up. The continuity of care offered by primary healthcare settings allows for personalized management strategies that can be adapted over time based on patients' clinical status and functional capacity (Ayadi et al., 2026; Blaney et al., 2025; Condori-fern & Gandoy-crego, 2026).

Case reports remain a valuable source of evidence in clinical medicine, particularly for illustrating real-world challenges and individualized management strategies that may not be fully captured in large-scale clinical trials. In geriatric patients with multiple comorbidities and acute presentations, standardized clinical guidelines often require contextual adaptation to address individual patient needs. Case reports provide practical insights into the application of holistic principles in everyday clinical practice (Garcia-cabello et al., 2026; Ko et al., 2026; Li et al., 2025; Patel et al., 2020). This case report aims to describe the diagnosis and holistic management of dyslipidemia in a geriatric patient with comorbid hypertension, a history of hyperuricemia, and an acute lower extremity injury following trauma. By highlighting the integration of pharmacological therapy, lifestyle modification, psychosocial support, and family involvement within a primary healthcare setting, this report seeks to emphasize the importance of holistic care in optimizing metabolic control, functional recovery, and quality of life in elderly patients.

2. Materials and Methods

2.1. Study Design and Setting

This study was conducted using a descriptive case report design. The case was identified and managed at the Kupang Kota Community Health Center, Bandar Lampung, Indonesia, a primary healthcare facility providing comprehensive services for chronic disease management in the geriatric population. The case report focuses on the holistic management of dyslipidemia in an elderly patient with multiple metabolic comorbidities and an acute traumatic condition.

2.2. Participant and Ethical Considerations

The participant was a 70-year-old male patient who attended the health center for medical evaluation and treatment. Written informed consent was obtained from the patient for the use of anonymized clinical data for academic and publication purposes. Patient confidentiality was strictly maintained throughout the reporting process in accordance with ethical standards and the Declaration of Helsinki.

2.3. Data Collection

Clinical data were collected through a comprehensive and systematic assessment, including detailed anamnesis, physical examination, and review of medical records. Anamnesis focused on presenting complaints, history of chronic diseases, medication use, lifestyle factors (dietary habits, physical activity), history of falls or trauma, and psychosocial and family support. Physical examination included general assessment, vital signs, cardiovascular and musculoskeletal evaluation, with particular attention to the affected lower extremity.

2.4. Laboratory and Supporting Examinations

Laboratory investigations were performed as part of routine clinical evaluation at the primary healthcare level. Parameters assessed included fasting plasma glucose, total cholesterol, and serum uric acid levels. These examinations were interpreted based on national clinical guidelines for dyslipidemia, hypertension, and metabolic disorders. Radiological examination was not routinely performed and was reserved for cases with clinical suspicion of fracture or severe structural injury.

2.5. Holistic Assessment Framework

A holistic assessment approach was applied using the biopsychosocial-spiritual model. Biological aspects included metabolic disorders and acute injury status. Psychological assessment addressed pain perception, anxiety, and fear of falling. Social evaluation focused on family support, daily functioning, and access to healthcare services. Spiritual aspects were explored in relation to the patient's coping mechanisms and acceptance of chronic illness.

2.6. Intervention and Follow-up

Management consisted of integrated pharmacological and non-pharmacological interventions. Pharmacological therapy included lipid-lowering agents, antihypertensive medications, and analgesics for acute pain management. Non-pharmacological interventions encompassed lifestyle modification, dietary counseling, physical activity recommendations, fall prevention education, and family involvement. The patient was scheduled for follow-up evaluation within 4–8 weeks to assess clinical improvement and metabolic control.

3. Results and Discussion

The patient, RE, a 70-year-old male, presented to a primary healthcare center with swelling and intermittent pain in the right lower extremity following a fall. The history of trauma was significant, as falls are a common occurrence in geriatric patients and often represent the initial trigger for healthcare utilization in this population ([Egan et al., 2024](#); [Ulpathakumbura et al., 2026](#)). The patient's past medical history included hypertension, dyslipidemia, and gout, indicating a long-standing metabolic and cardiovascular risk profile. No history of diabetes mellitus or previous cardiovascular events was reported ([Slee et al., 2026](#); [W. Wang et al., 2026](#); [Zhou et al., 2026](#)).

Initial laboratory investigations revealed elevated total cholesterol of 242 mg/dL, which met the diagnostic threshold for dyslipidemia and placed the patient in a high-risk category for atherosclerotic cardiovascular disease (ASCVD). Fasting plasma glucose was 102 mg/dL, indicating borderline normoglycemia, while serum uric acid level was 6.6 mg/dL, which is considered high-normal and clinically relevant in the context of gout history and metabolic comorbidity. Physical examination was unremarkable except for localized edema and tenderness in the right lower extremity, consistent with a soft tissue injury following trauma. There were no clinical signs suggestive of heart failure, deep vein thrombosis, or acute infection ([Garcia-cabello et al., 2026](#); [Ko et al., 2026](#); [Li et al., 2025](#); [Patel et al., 2020](#)).

Based on these findings, the primary biomedical diagnosis was dyslipidemia, accompanied by comorbid hypertension and hyperuricemia, with a provisional diagnosis of post-traumatic soft tissue injury of the right lower extremity. The coexistence of these conditions reflects a typical pattern of geriatric polyopathy, in which multiple chronic diseases interact and contribute to cumulative health risk. In elderly patients, dyslipidemia combined with hypertension significantly accelerates atherosclerotic processes, increasing the likelihood of coronary artery disease and cerebrovascular events ([Chen et al., 2025](#); [Lin et al., 2025](#); [Tsai et al., 2025](#)).

A holistic assessment was conducted using a biopsychosocial-spiritual framework. From a biological perspective, the patient exhibited multiple metabolic risk factors, including dyslipidemia and hyperuricemia, compounded by an acute musculoskeletal injury that limited mobility. Psychologically, the patient expressed concern and mild anxiety related to pain and fear of falling again, which is commonly observed in elderly individuals after trauma. Fear of falling is known to contribute to activity avoidance, leading to physical deconditioning and further metabolic deterioration. Social assessment revealed that the patient lived with family members who were actively involved in his care, providing support for daily activities and facilitating access to healthcare services. From a spiritual perspective, the patient demonstrated acceptance of his chronic conditions and expressed motivation to improve his health in accordance with personal beliefs and values ([Cannizzaro & Spessotto, 2025](#); [Lien et al., 2025](#)).

The management strategy was designed to address both acute and chronic conditions in an integrated manner. Pharmacological intervention included the initiation of statin therapy to reduce total cholesterol levels and mitigate ASCVD risk. The selection and dosage of statin were adjusted to the patient's age and comorbidities to minimize adverse effects. Antihypertensive therapy was continued and monitored to maintain optimal blood pressure control, recognizing the synergistic role of hypertension and dyslipidemia in cardiovascular disease progression. Analgesic therapy, primarily with paracetamol, was provided to manage pain associated with the soft tissue injury, alongside non-

pharmacological measures such as limb elevation to reduce edema. Non-steroidal anti-inflammatory drugs were used cautiously due to potential renal and cardiovascular risks in the elderly (Ding et al., 2025; Garg et al., 2025; Hoyek et al., 2025).

Non-pharmacological interventions constituted a central component of the management plan. The patient received structured dietary counseling emphasizing a low saturated fat and low cholesterol diet to improve lipid profile, a low salt diet to support blood pressure control, and a low purine diet to prevent hyperuricemia exacerbation. This integrated dietary approach is particularly relevant in geriatric patients with overlapping metabolic disorders, as it avoids fragmented or contradictory nutritional advice. During the acute injury phase, physical activity was temporarily limited to prevent further trauma; however, gradual reintroduction of low-impact exercise, such as walking and elderly gymnastics, was planned following symptom resolution (Al et al., 2025; Mandolesi et al., 2025; J. Wang et al., 2025).

Patient and family education was prioritized as a key intervention. The patient and caregivers were informed about the importance of medication adherence, lifestyle modification, and fall prevention strategies. Family involvement was instrumental in ensuring dietary compliance, monitoring physical activity, and supporting the patient's recovery process. Education also addressed the long-term risks associated with uncontrolled dyslipidemia and hypertension, including stroke and myocardial infarction, thereby enhancing the patient's motivation to engage in preventive measures (Terrin et al., 2025).

Follow-up evaluation conducted within 4–8 weeks demonstrated favorable clinical outcomes. The edema and pain in the right lower extremity had resolved, allowing the patient to resume daily activities with improved confidence and mobility. Blood pressure readings showed improved control, and although repeat lipid measurements were not detailed in this report, clinical expectations included a reduction in total cholesterol levels in response to statin therapy and lifestyle modification. Importantly, the patient reported increased awareness of health behaviors and expressed commitment to maintaining dietary and physical activity recommendations. This case underscores the importance of integrated and holistic care in managing geriatric patients with dyslipidemia and multiple comorbidities. The presence of acute trauma served as a critical entry point for comprehensive health assessment and intervention, highlighting how acute events can be leveraged to optimize chronic disease management. Unlike conventional disease-centered approaches that focus on single diagnoses, the holistic strategy applied in this case addressed the interconnected biological, psychological, and social factors influencing health outcomes (Garcia-cabello et al., 2026; Ko et al., 2026; Li et al., 2025; Patel et al., 2020).

The novelty of this case lies in illustrating how primary healthcare settings can effectively implement holistic management strategies for complex geriatric patients. By integrating acute injury management with long-term metabolic risk reduction, healthcare providers can improve not only biochemical parameters but also functional status and quality of life. This approach aligns with the principles of family medicine and geriatric care, emphasizing continuity, patient-centeredness, and contextualized treatment planning. The favorable outcome observed in this case supports the application of holistic, integrated management for elderly patients with dyslipidemia and comorbid conditions. Addressing acute and chronic health issues simultaneously, with active involvement of patients and families, represents a practical and effective model for improving health outcomes in geriatric populations within primary care systems.

4. Conclusions

This case report demonstrates the clinical complexity of managing dyslipidemia in a geriatric patient with multiple metabolic comorbidities, including hypertension and a history of hyperuricemia, compounded by an acute lower extremity injury following trauma. The coexistence of chronic metabolic disorders and acute musculoskeletal conditions illustrates the multifactorial challenges commonly encountered in elderly patients, particularly within primary healthcare settings. The findings of this case emphasize that dyslipidemia in elderly individuals should not be managed in isolation. Instead, effective care requires an integrated and holistic approach that simultaneously addresses lipid abnormalities, blood pressure control, metabolic risk factors, functional limitations, and psychosocial aspects of health. The application of a biopsychosocial-spiritual framework enabled a comprehensive assessment and tailored intervention strategy that considered not only biomedical parameters but also psychological well-being, family support, and patient motivation. Pharmacological therapy, including statin administration and continuation of antihypertensive treatment, proved essential in reducing cardiovascular risk, while non-pharmacological interventions such as structured dietary modification, gradual physical activity, and patient-family education played a critical role in sustaining long-term disease control. The resolution of trauma-related symptoms and improvement in functional mobility further highlight the importance of integrating acute injury management into chronic disease care in geriatric patients. The novelty of this case lies in demonstrating how an acute traumatic event can serve as an opportunity to optimize chronic disease management through holistic intervention at the primary care level. By leveraging continuity of care and family involvement, primary healthcare providers can enhance treatment adherence, improve functional outcomes, and potentially reduce the risk of atherosclerotic cardiovascular events. In conclusion, holistic management of dyslipidemia in geriatric patients with complex comorbidities is both feasible and effective when implemented in a primary healthcare setting. This approach contributes to improved clinical outcomes, better quality of life, and more sustainable long-term management for elderly patients, underscoring the importance of integrated, patient-centered care in geriatric medicine.

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Informed Consent Statement: Written informed consent has been obtained from the patient's guardian to publish this case report, including clinical details and images.

Data Availability Statement: All data supporting the findings of this study are contained within the article. No additional datasets were generated or analyzed.

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