
Implementation Of Two-Hourly Repositioning For The Prevention Of Pressure Injury In Two Patients With Ischemic Stroke And Pneumonia In The Intensive Care Unit (ICU): A Case Study

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Abstract

Pressure injury remains an important patient safety indicator and continues to pose a significant challenge in healthcare, particularly among patients with limited mobility. Patients with ischemic stroke complicated by pneumonia are at high risk of developing pressure injuries due to prolonged immobility, physical weakness, and reduced activity tolerance. In the ICU of Hospital X, five cases of pressure injury were reported between January and December 2025. Furthermore, from January to May 2026, a total of 146 bedridden patients were identified as being at risk for pressure injury based on the COMHON Index. Repositioning every two hours is a recommended nursing intervention for preventing pressure injuries. To analyze the implementation of nursing care through two-hourly repositioning as an intervention to prevent the risk of pressure injury in two patients with ischemic stroke and pneumonia. This study employed a case study design using the nursing care process involving two patients with ischemic stroke complicated by pneumonia who were at risk of developing pressure injury. Patient assessment was conducted using the COMHON Index, followed by the implementation of two-hourly repositioning and regular skin condition monitoring throughout the course of care. Two-hourly repositioning was successfully implemented according to the planned nursing interventions. During the two-day observation period, neither patient developed a pressure injury, and skin integrity was maintained. In the patient classified as high risk, blanchable erythema was observed over the sacral area but improved following regular repositioning and continuous skin assessment. Two-hourly repositioning is an effective nursing intervention that supports the prevention of pressure injury in patients with ischemic stroke and pneumonia. This intervention should be implemented consistently and accompanied by regular skin assessment to maintain skin integrity.

Keywords: Pressure Injury, Two-Hourly Repositioning, Ischemic Stroke, Pneumonia, Nursing Care.

INTRODUCTION

Pressure injury is defined as localized damage to the skin and/or underlying tissue resulting from prolonged pressure or a combination of pressure and shear forces. This condition remains an important indicator of hospital quality of care because it increases the risk of infection, prolongs the length of hospital stay, and raises healthcare costs. Patients with limited mobility are among the groups at greatest risk of developing *pressure injuries*; therefore, preventive measures constitute an essential component of nursing care (EPUAP, NPIAP, & PPPIA, 2019; WHO, 2022).

Patients with ischemic stroke complicated by pneumonia are at particularly high risk of developing *pressure injuries*. Stroke causes impaired mobility and dependence in activities of daily living, while pneumonia reduces activity tolerance due to respiratory impairment. The combination of these conditions often results in prolonged bed rest, increasing sustained pressure over bony prominences and consequently elevating the risk of skin breakdown and impaired tissue integrity (Gefen et al., 2022).

Two-hourly repositioning is a nursing intervention recommended in international *pressure injury* prevention guidelines to reduce prolonged pressure, improve tissue perfusion, and maintain skin integrity in patients with limited mobility (EPUAP, NPIAP, & PPPIA, 2019). Although this intervention has become a standard nursing practice, reports describing the implementation of two-hourly repositioning in patients with ischemic stroke and pneumonia in intensive care settings remain limited.

Data from the ICU of Hospital X showed that between January and December 2025, five cases of *pressure injury* were reported, three of which had already developed before hospital admission.

Furthermore, from January to May 2026, a total of 146 bedridden patients were identified as being at risk of *pressure injury* based on the COMHON Index, including patients with ischemic stroke and pneumonia. These findings highlight the need for optimal implementation of preventive interventions accompanied by continuous evaluation of *pressure injury* risk. Therefore, this case report aims to analyze the implementation of nursing care through two-hourly repositioning in patients with ischemic stroke and pneumonia who were at risk of developing *pressure injury* in the ICU of Hospital X.

RESEARCH METHODS

This study was conducted as a case report using a nursing care approach involving two patients with ischemic stroke and pneumonia who were at risk of developing *pressure injury* in the ICU of Hospital X. Cases were selected based on similar clinical characteristics, including a diagnosis of ischemic stroke and pneumonia, limited mobility, and a risk of *pressure injury* as determined by the COMHON Index. Nursing care was provided to the first patient from June 9–10, 2026, and to the second patient from June 17–18, 2026.

Data were collected through direct observation, physical examination, interviews with patients' family members, and review of medical records. The primary intervention consisted of two-hourly repositioning in accordance with *pressure injury* prevention guidelines, while maintaining proper body alignment and using supportive pillows as needed. Evaluation was performed through regular assessment of skin condition over bony prominences and reassessment of *pressure injury* risk using the COMHON Index.

The data were analyzed descriptively by comparing the assessment findings, nursing interventions, and evaluation outcomes between the two cases based on the Indonesian Nursing Diagnosis Standards (SDKI), Indonesian Nursing Intervention Standards (SIKI), and Indonesian Nursing Outcomes Standards (SLKI).

RESULTS AND DISCUSSION

Results

Patient Characteristics

The assessment results indicate that both patients were elderly with medical diagnoses of sepsis, pneumonia, and ischemic stroke, who were treated in the ICU at Hospital X. Both patients were characterized by mild decreased consciousness and total immobility, resulting in complete dependence on nurses for daily activities.

Differences in clinical condition were noted in their therapeutic and nutritional status. Patient 1 received enteral nutrition via PEG, while Patient 2 was fasting and on vasoactive therapy. Detailed patient characteristics are shown in Table 1.

Table 1. Patient Characteristics

Characteristic	Patient 1	Patient 2
Initials	Mrs. E	Mr. J
Age	76 years	76 years
Sex	Female	Male
Medical Diagnosis	Sepsis, Pneumonia, Ischemic Stroke	Sepsis, Pneumonia, Ischemic Stroke
Comorbidities	None	Chronic Kidney Disease (CKD) on Hemodialysis (HD)
Nursing Diagnoses	1. Ineffective Airway Clearance (SDKI D.0001) related to retained secretions.2. Impaired Physical Mobility (SDKI D.0054) related to decreased muscle strength.3. Risk for Impaired Skin/Tissue Integrity (SDKI D.0139) evidenced by decreased mobility.	1. Ineffective Airway Clearance (SDKI D.0001) related to retained secretions.2. Impaired Physical Mobility (SDKI D.0054) related to decreased muscle strength.3. Risk for Impaired Skin/Tissue Integrity (SDKI D.0139) evidenced by decreased mobility.

Glasgow Coma Scale (GCS)	E4 M5 V1	E4 M5 V1
Ventilatory Support	Not mechanically ventilated; tracheostomy with T-piece oxygen at 4 L/min	Not mechanically ventilated; tracheostomy with T-piece oxygen at 6 L/min
Vasoactive Therapy	None	Vascon 0.05 mcg/kgBW/min
Nutrition	Via PEG: Proten 125 mL × 6/day + Fresactive 5 g × 3/day	Nil per os (NPO) due to vomiting
Mobility	Fully assisted with right and left lateral positioning due to a history of stroke and upper/lower limb muscle strength of 2/5	Fully assisted with right and left lateral positioning due to a history of stroke and upper/lower limb muscle strength of 3/5
Initial COMHON Index	10	14
Pressure Injury Risk	Moderate	High

The analysis results showed that both patients were at risk of pressure injury based on the COMHON Index, with Patient 1 at moderate risk and Patient 2 at high risk. This condition was influenced by immobilization, impaired oxygenation, and the critical condition in the ICU.

Implementation of Repositioning and Skin Evaluation

Nursing procedures, including repositioning every 2 hours, were consistently implemented for both patients during the two days of observation in the ICU. Repositioning was performed in the right lateral, left lateral, and supine positions with the assistance of two nurses and support devices to maintain body alignment. The results of the implementation and evaluation of the patients' skin conditions are shown in Table 2.

Table 2. Implementation on Days 1 and 2

Day	Intervention	Patient 1	Patient 2
Day 1	Repositioning Every 2 Hours	Repositioning was performed every 2 hours by alternating between the right lateral, left lateral, and supine positions. Patient mobilization was assisted by two nurses.	Repositioning was performed every 2 hours by alternating between the right lateral, left lateral, and supine positions. Patient mobilization was assisted by two nurses.
	Skin Assessment	Skin remained intact with normal skin color. No redness, abrasions, or wounds were observed over the sacrum, heels, elbows, or trochanters.	Skin remained intact with no evidence of pressure injury. Slight blanchable redness was observed over the sacral area and resolved after repositioning.
	Body Alignment	Proper body alignment was maintained with the head, neck, trunk, and extremities positioned in a neutral alignment. Pillows were placed behind the back and between the legs for support.	Proper anatomical body alignment was maintained. The head of the bed was elevated to approximately 30°, and pillows were positioned behind the back, under the arms, and between the legs to reduce pressure on bony prominences.
Day 2	Repositioning Every 2 Hours	Repositioning continued every 2 hours according to schedule without any difficulties during the intervention.	Repositioning continued consistently every 2 hours with assistance from two nurses.
	Skin Assessment	Skin remained intact with no redness or signs of impaired skin integrity over bony prominences.	Sacral redness was no longer visible. The skin remained intact with no evidence of pressure injury.
	Body Alignment	Proper body alignment was maintained throughout bed rest. The patient remained comfortable and stable with the support of positioning pillows.	Proper body alignment was maintained in an anatomical position, with pillows used to support areas at risk of pressure-related injury.

Observations showed that neither patient experienced any skin integrity issues during the treatment period. Patient 2 experienced mild redness on the first day, which was transient and resolved after repositioning. Overall, both patients' skin remained intact throughout the observation period.

COMHON Index Evaluation

Pressure injury risk assessment using the COMHON Index was conducted over two days of observation to assess changes in the patients' risk conditions. The evaluation results are shown in Tables 3 and 4.

Table 3. COMHON Index Evaluation for Patient 1

Parameter	Day 1	Day 2	Remarks
Level of Consciousness	2	2	GCS E4 M5 V1; no change in level of consciousness.
Mobility	2	2	Bed rest; assisted repositioning every 2 hours.
Hemodynamic Status	2	2	Hemodynamically stable without vasopressor support.
Oxygenation	2	2	Oxygen administered via T-piece at 4 L/min.
Nutrition	2	2	Enteral nutrition via PEG.
Total Score	10	10	No change in the total score.
Risk Category	Moderate	Moderate	No pressure injury occurred.

Table 4. COMHON Evaluation of Patient Index 2

Parameter	Day 1	Day 2	Remarks
Level of Consciousness	2	2	GCS E4 M5 V1.
Mobility	2	2	Bed rest; assisted repositioning every 2 hours.
Hemodynamic Status	4	4	Receiving vasopressor therapy (Vascon 0.05 mcg/kgBW/min).
Oxygenation	3	3	Oxygen administered via T-piece at 6 L/min.
Nutrition	3	3	Nil per os (NPO); nutritional intake remained inadequate.
Total Score	14	14	No change in the total score.
Risk Category	High	High	No pressure injury occurred.

The evaluation results showed that the COMHON Index scores of both patients remained unchanged throughout the observation period. This finding indicates that the major risk factors, including immobility, impaired oxygenation, and critical illness, persisted during their ICU stay; however, these risk factors did not progress to the development of a *pressure injury*.

Discussion

The findings from both cases demonstrated that patients with ischemic stroke complicated by pneumonia were at high risk of developing *pressure injuries* due to the combined effects of neurological impairment, reduced mobility, and underlying systemic conditions. Both patients were completely dependent on nursing staff for activities of daily living throughout their stay in the Intensive Care Unit (ICU), making all body position changes reliant on nursing interventions. Consequently, prolonged pressure over bony prominences was unavoidable and could potentially compromise tissue perfusion if appropriate preventive measures were not implemented.

From a pathophysiological perspective, ischemic stroke disrupts cerebral blood flow, resulting in neurological deficits such as limb weakness, impaired coordination, sensory dysfunction, and reduced ability to mobilize independently. These impairments are further aggravated by pneumonia, which compromises gas exchange, decreases tissue oxygenation, and increases metabolic demand. The combination of these conditions prolongs bed rest and substantially increases the risk of developing *pressure injuries*. According to Hinkle et al. (2025), patients with neurological disorders are at greater risk of *pressure injury* because of impaired mobility, sensory deficits, and an inability to reposition themselves independently. Furthermore, Gefen et al. (2022) explained that sustained pressure over bony prominences obstructs capillary blood flow, leading to tissue hypoxia, ischemia, and ultimately tissue damage if pressure is not relieved promptly.

Although both patients shared the same medical diagnoses, their risk levels differed according to the COMHON Index. Mrs. E had a score of 10, indicating a moderate risk, whereas Mr. J had a score of 14, indicating a high risk. This difference was attributable to Mr. J's more complex clinical condition, which included sepsis, chronic kidney disease (CKD) requiring hemodialysis, vasopressor therapy, and impaired nutritional status during hospitalization. Vasopressor administration may induce peripheral vasoconstriction, thereby reducing skin perfusion and increasing the risk of ischemia in pressure-bearing areas. In addition, inadequate nutritional status impairs protein synthesis and tissue regeneration, reducing skin tolerance to sustained pressure. Hinkle et al. (2025) noted that patients

with hemodynamic instability, vasopressor use, malnutrition, and critical illness are at substantially greater risk of developing *pressure injuries* than those without these systemic complications.

Despite their differing risk levels, the nursing interventions provided to both patients were based on the principles of *pressure injury* prevention outlined in the Indonesian Nursing Intervention Standards (SIKI). These interventions included two-hourly repositioning, regular skin assessment, the use of pressure-relieving mattresses, maintenance of proper body alignment, the use of supportive pillows, and collaboration to ensure adequate nutritional support. Patients were repositioned alternately between the supine, right lateral, and left lateral positions while ensuring the safety of all attached medical devices. This strategy aimed to reduce prolonged pressure on specific body areas and maintain adequate tissue perfusion. These findings are consistent with Cox et al. (2022), who demonstrated that structured *pressure injury* prevention strategies, including scheduled repositioning and routine skin monitoring, reduce the incidence of *pressure injuries* among high-risk patients in intensive care settings. Consistent implementation of preventive measures is particularly important because critically ill patients commonly present with multiple concurrent risk factors, including immobility, impaired perfusion, and acute illness.

The implementation results showed that neither patient developed a *pressure injury* during the observation period. In Mr. J, blanchable erythema was observed over the sacral area on the first day; however, the erythema resolved following consistent repositioning and did not progress to tissue damage. Meanwhile, Mrs. E maintained intact skin integrity throughout the observation period. These findings suggest that two-hourly repositioning contributes to maintaining skin integrity despite the continued presence of risk factors such as immobility, neurological impairment, and systemic disease.

Physiologically, repositioning aims to reduce the duration of tissue pressure, restore capillary blood flow, improve tissue oxygen delivery, and prevent hypoxia that may progress to tissue necrosis. The international EPUAP/NPIAP/PPPIA (2019) guidelines recommend regular repositioning as one of the primary strategies for preventing *pressure injuries* in patients with limited mobility. These guidelines further emphasize that repositioning intervals should be individualized according to the patient's clinical condition, tissue tolerance, and the use of appropriate support surfaces.

The findings of this case report are supported by Gillespie et al. (2021), who reported that scheduled repositioning reduces the incidence of *pressure injuries* in immobilized adult patients by minimizing the duration of sustained tissue pressure. Similarly, Asiri (2023) found that repositioning at intervals of two to three hours can serve as an effective strategy for maintaining skin integrity in high-risk patients. Therefore, the implementation of two-hourly repositioning in these cases was consistent with current evidence-based practice recommendations.

The successful prevention of *pressure injuries* in both patients cannot be attributed solely to repositioning but rather to the comprehensive nursing care provided. Latimer et al. (2022) reported that combining repositioning with the use of support surfaces is more effective than repositioning alone because it promotes a more even distribution of body pressure. Furthermore, Tayyib and Coyer (2021) emphasized that a multidimensional approach—including repositioning, skin care, moisture management, nutritional support, and continuous patient monitoring—produces better outcomes in preventing *pressure injuries* among critically ill patients. These findings are reinforced by Alderden et al. (2021), who explained that ICU patients are particularly susceptible to *pressure injuries* due to the complexity of their clinical conditions, the use of medical devices, hemodynamic instability, and limited mobility. Consequently, effective *pressure injury* prevention requires a comprehensive approach that extends beyond a single intervention to include continuous risk assessment and preventive strategies. This approach was reflected in the nursing care provided to both patients, which incorporated not only repositioning but also the use of pressure-relieving mattresses, routine skin assessments, maintenance of proper body alignment, and collaboration with dietitians to optimize nutritional status.

Overall, the findings of this case study indicate that two-hourly repositioning was beneficial in maintaining skin integrity throughout the observation period in patients with ischemic stroke and

pneumonia receiving intensive care. The effectiveness of this intervention may be enhanced when combined with risk assessment using the COMHON Index, the use of appropriate support surfaces, regular skin monitoring, and individualized nutritional management according to each patient's clinical condition. These findings further underscore the importance of implementing evidence-based nursing care to prevent *pressure injuries* in critically ill patients with limited mobility.

CONCLUSIONS

Implementation of Two-Hour Repositioning for the Prevention of *Pressure Injury* in Two Patients with Ischemic Stroke and Pneumonia Admitted to the *Intensive Care Unit* (ICU) supported the maintenance of skin integrity throughout the observation period. Although the two patients had different levels of *pressure injury* risk based on the COMHON Index, no *pressure injury* developed by the end of the observation. In the patient with the higher risk, only *blanchable erythema* was observed, which improved following consistent repositioning and did not progress to tissue damage.

The successful prevention of *pressure injury* was not solely attributable to two-hour repositioning but was also supported by regular risk assessment, the use of an anti-decubitus mattress, maintenance of proper *body alignment*, routine skin assessment, and collaborative nutritional management. These findings indicate that comprehensive and consistent nursing interventions play a crucial role in preserving skin integrity among critically ill patients with limited mobility due to ischemic stroke and pneumonia in the ICU.

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