

## Cardiovascular Physiotherapy After Mitral Valve Replacement for Rheumatic Heart Disease: A Case Report

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### Abstract

**Background:** Rheumatic heart disease can cause severe valvular abnormalities requiring mitral valve replacement and early postoperative rehabilitation. Detailed descriptions of staged physiotherapy during the immediate postoperative period remain limited.

**Objective:** To describe physiotherapy assessment, intervention, clinical progression, and documented outcomes following mitral valve replacement in a patient with rheumatic heart disease.

**Methods:** This descriptive case report involved a 54-year-old woman who underwent mitral valve replacement on 29 August 2025. Five physiotherapy sessions were documented from 31 August to 5 September 2025. Interventions progressed according to the documented clinical condition, from positioning, passive ankle pumping, and passive knee range of motion to breathing and coughing exercises, sitting, active assisted knee exercise, standing, and active ankle pumping.

**Results:** Glasgow Coma Scale increased from 8 to 15. Oxygen saturation increased from 97% to 99%, while respiratory rate decreased from 27 to 25 breaths/minute. The Barthel Index increased from 5 to 11, Borg CR10 decreased from 3 to 1, Hamilton Anxiety Rating Scale decreased from 29 to 22, and metabolic equivalents increased from 1 to 2. New York Heart Association classification changed from class II to III, whereas Killip classification remained class I. No adverse events were reported. No follow up or discharge information after 5 September 2025 was available.

**Conclusion:** Clinical and functional changes were documented during early postoperative recovery while staged physiotherapy was provided alongside surgical and medical management. This single case cannot establish treatment effectiveness or causal attribution.

### Keywords

cardiac rehabilitation; cardiovascular physiotherapy; case report; mitral valve replacement; rheumatic heart disease

### Introduction

Rheumatic heart disease (RHD) is a chronic consequence of acute rheumatic fever that may cause permanent valvular damage and progressive cardiovascular morbidity. Despite advances in prevention and treatment, RHD remains an important cause of valvular heart disease, particularly in low- and middle-income countries where delayed diagnosis and limited access to appropriate care may contribute to disease progression. Hospital-based data from Indonesia have shown that patients with RHD frequently present with clinically significant valvular abnormalities, with isolated mitral stenosis being the most common valve lesion.<sup>1</sup> Global burden analyses also indicate that RHD continues to affect substantial populations, including younger individuals and women of childbearing age.<sup>2,3</sup>

The mitral valve is commonly affected in RHD, and progressive valvular dysfunction may contribute to impaired cardiac function, reduced exercise tolerance, dyspnea, pulmonary vascular involvement, and structural remodeling of the cardiac chambers. Echocardiography has an essential role in characterizing the type and severity of valvular abnormalities and supporting clinical decision making in patients with rheumatic valvular disease.<sup>4</sup> In the present case, the patient had severe primary mitral regurgitation, moderate mitral stenosis associated with RHD, mild aortic regurgitation, and moderate to severe tricuspid regurgitation with a high probability of pulmonary hypertension. These combined abnormalities represented a substantial cardiovascular burden and ultimately required mitral valve replacement.

Although valve replacement may correct the primary mechanical abnormality, the immediate postoperative period is often characterized by reduced mobility, respiratory limitations, pain, impaired physical capacity, and dependence in basic activities. Following median sternotomy, postoperative pain and respiratory impairment may interfere with deep breathing and effective coughing, potentially contributing to secretion retention and pulmonary complications.<sup>5</sup> In addition, prolonged bed rest and reduced consciousness may further limit early mobilization and increase the risk of functional decline. Consequently, physiotherapy during the early postoperative phase must consider the patient's neurological status, respiratory condition, hemodynamic stability, postoperative restrictions, invasive devices, and ability to participate in progressively more active interventions.

Early cardiac rehabilitation after heart valve surgery has incorporated interventions such as sitting, standing, walking, and progressive physical activity according to the patient's clinical condition and functional capacity.<sup>6,7</sup> Evidence from postoperative cardiac rehabilitation reviews indicates heterogeneity in exercise protocols across studies, with some interventions individualizing exercise dose and intensity according to participants' functional capacity and specific goals.<sup>6</sup> More recent literature concerning rehabilitation after mitral valve intervention similarly highlights the importance of patient specific assessment, risk stratification, and tailored exercise progression.<sup>5,6,7</sup> However, evidence from clinical studies cannot be directly used to establish the effectiveness of physiotherapy in an individual case because postoperative recovery occurs concurrently with surgical treatment, medical management, and the natural recovery process.

The immediate postoperative period may present additional challenges when a patient initially has reduced consciousness and limited capacity to participate in standardized functional assessment or active exercise. In this context, physiotherapy management may need to progress from low demand interventions, such as positioning and passive limb movement, toward respiratory exercises and functional mobility as the patient's clinical condition permits. The progression of intervention therefore depends on the documented clinical response rather than on a fixed exercise protocol. Detailed reporting of this process is clinically relevant because the rationale, timing, and progression of physiotherapy interventions may vary substantially among patients following valve surgery.

Although the role of cardiac rehabilitation after valve surgery has been increasingly described, detailed case documentation integrating physiotherapy assessment, staged intervention, clinical progression, and documented outcomes in a patient with RHD and multiple valvular abnormalities following mitral valve replacement remains limited. The clinical contribution of this case lies in its description of physiotherapy management during the immediate postoperative period, including the progression from passive interventions during reduced consciousness to breathing exercises and functional mobility as the patient's documented condition improved. Rather than demonstrating treatment effectiveness, this case provides a structured account of how available clinical findings were used to guide the progression of physiotherapy during early inpatient recovery.

Therefore, this case report aimed to describe the physiotherapy assessment, staged intervention, clinical progression, and documented outcomes in a patient with RHD following mitral valve replacement. The report also highlights the importance of cautious interpretation of postoperative changes because the observed clinical course occurred alongside surgery, intensive care management, medical treatment, and expected postoperative recovery.

## Methods

This study was a descriptive case report based on clinical documentation of postoperative physiotherapy management. The case was managed at the Integrated Heart Center of Dr. Wahidin Sudirohusodo Hospital, Makassar, Indonesia. Mitral valve replacement was performed on 29 August 2025. The first documented physiotherapy assessment was conducted on 31 August 2025, followed by physiotherapy sessions on 1, 2, 3, and 5 September 2025. Accordingly, the observation period reported in this case extended from the first physiotherapy assessment on 31 August 2025 to the final documented assessment on 5 September 2025. Although the clinical team remained in the placement setting until 12 September 2025, no additional physiotherapy, follow up, or clinical outcome data after 5 September 2025 were available and were therefore not included in the analysis.

The patient was a 54-year-old woman who underwent mitral valve replacement under general anesthesia. Based on the available echocardiographic record and subsequent author confirmation, the primary diagnosis was severe primary mitral regurgitation. Additional documented abnormalities included moderate mitral stenosis associated with rheumatic heart disease, mild aortic regurgitation, and moderate to severe tricuspid regurgitation with a high probability of pulmonary hypertension. The clinical history included progressive dyspnea for approximately one-year, intermittent palpitations, and white sputum production for two days before the initial physiotherapy assessment. The recorded medications included warfarin, bisoprolol, and furosemide.

Clinical information was obtained from the available medical and physiotherapy records, including anamnesis, physical examination, electrocardiography, echocardiography, chest radiography, routine laboratory findings, vital signs, and functional assessment. The physiotherapy examination documented the Glasgow Coma Scale (GCS), blood pressure, peripheral oxygen saturation (SpO<sub>2</sub>), respiratory rate, heart rate, joint movement, and muscle strength. Additional outcome measures included the New York Heart Association (NYHA) classification, Killip classification, Barthel Index, Borg CR10 scale, Hamilton Anxiety Rating Scale (HARS), and metabolic equivalent of task (MET).<sup>9</sup>

The numerical scores documented in the clinical record were extracted without retrospective modification. NYHA classification was recorded as class II at the initial assessment and class III at the final assessment, whereas Killip classification remained class I. The Barthel Index changed from 5 to 11, Borg CR10 from 3 to 1, HARS from 29 to 22, and MET from 1 to 2. The specific instrument versions, detailed administration procedures, and item level scoring methods were not available in the supplied clinical documentation and were therefore not reconstructed. These values were reported as documented clinical measurements and interpreted cautiously within the context of a single case.

Ankle and foot edema were identified during clinical examination; however, no quantitative assessment method, circumference measurement, volume measurement, or standardized pitting grade was documented. Edema was therefore treated as a clinical observational finding rather than a quantitative outcome. Similarly, the Karvonen formula was not used to prescribe exercise intensity because the required parameters and calculation were not documented and the author confirmed that the formula was not applied.

Physiotherapy interventions were selected according to the documented clinical condition and functional capacity at each treatment session. During the initial phase, when the patient had markedly reduced consciousness and was managed in the intensive care unit, treatment consisted of therapeutic communication with the family, positioning, passive ankle pumping, and passive knee range of motion. Passive ankle pumping was performed during each documented treatment using 8 counts for 3 repetitions for approximately 3 to 5 minutes. Passive knee range of motion was performed using 8 counts for 2 repetitions through the available range of motion for approximately 5 minutes.

As the documented clinical condition improved, diaphragmatic and thoracic mobilization breathing exercises, coughing exercises, and sitting were introduced on 2 September 2025, when the GCS was recorded as 14 and active and passive joint movement were documented within normal limits. On 3 September 2025, active assisted knee exercise and further sitting activities were documented when muscle strength was recorded as grade 4. On 5 September 2025, standing and active ankle pumping were added, while breathing exercises and active assisted knee exercises were maintained.

The available documentation did not provide complete information regarding frequency, intensity, duration, repetitions, patient positioning, progression criteria, stopping criteria, or physiological response for breathing exercises, coughing exercises, sitting, standing, or other mobility activities. These parameters were therefore not estimated or retrospectively reconstructed. Progression was described according to the clinical sequence documented in the physiotherapy record rather than a standardized exercise algorithm.

Data were analyzed descriptively. Clinical findings, intervention progression, and documented outcomes were summarized according to the available assessment dates. No inferential statistical analysis was performed because this report involved a single patient and was intended to provide a descriptive account of the clinical course. Changes in measured values were presented as documented observations and were not interpreted as evidence of treatment effectiveness or causal effects of physiotherapy.

Written informed consent for publication of the case report was confirmed by the author. However, information regarding ethical approval, ethical exemption, the responsible ethics committee, institution, or approval or exemption number was not provided in the author confirmation. Therefore, no ethical approval or exemption statement is presented in this report beyond the available confirmation of informed consent.

## Results

The first documented physiotherapy assessment was conducted on 31 August 2025, two days after mitral valve replacement. The patient was a 54 year old woman who was managed in the intensive care unit. At the initial assessment, the Glasgow Coma Scale (GCS) score was 8. Blood pressure was 137/76 mmHg, peripheral oxygen saturation (SpO<sub>2</sub>) was 97%, respiratory rate was 27 breaths/minute, and heart rate was 80 beats/minute. These findings indicate that the patient was still in the early postoperative phase with reduced consciousness at the time of the initial physiotherapy assessment. The initial clinical findings and vital signs are presented in Table 1.

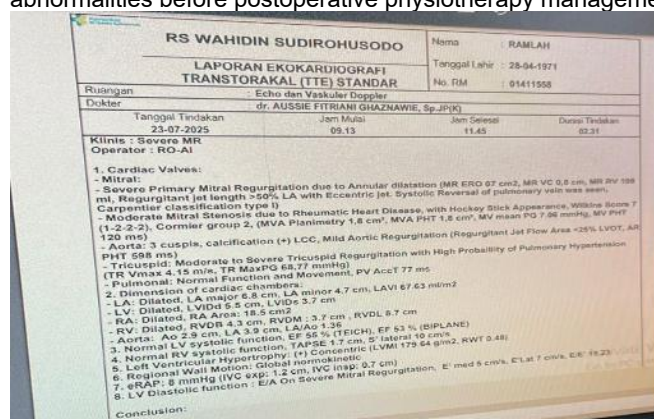
**Table 1.** Initial clinical findings and vital signs on 31 August 2025

| Parameter          | Initial finding   |
|--------------------|-------------------|
| Glasgow Coma Scale | 8                 |
| Blood pressure     | 137/76 mmHg       |
| SpO <sub>2</sub>   | 97%               |
| Respiratory rate   | 27 breaths/minute |
| Heart rate         | 80 beats/minute   |

SpO<sub>2</sub>: peripheral oxygen saturation.

The initial assessment also documented progressive dyspnea, intermittent palpitations, and white sputum production. Clinical examination identified a central venous pressure line, chest tube, sternotomy incision, and edema of the ankle and foot. No quantitative measurement of edema was performed. Therefore, edema was reported as a clinical observation and was not analyzed as a measured pre to post outcome.

Diagnostic examination showed severe primary mitral regurgitation, moderate mitral stenosis associated with rheumatic heart disease, mild aortic regurgitation, and moderate to severe tricuspid regurgitation with a high probability of pulmonary hypertension. Cardiac chamber enlargement and concentric left ventricular hypertrophy were also reported, while left and right ventricular systolic function were described as normal. These findings illustrate the presence of multiple valvular and structural cardiac abnormalities before postoperative physiotherapy management. The echocardiographic findings are presented in Figure 1.



**Figure 1.** Echocardiographic examination provided in the original case record.

The chest radiograph demonstrated cardiomegaly with a cardiothoracic ratio of 0.64 and enlargement of the right atrium and right ventricle without pulmonary infiltrates. This radiographic examination provides additional information regarding the patient's preoperative cardiac structural involvement. The chest radiograph is presented in Figure 2.



**Figure 2.** Chest radiograph provided in the original case record.

Routine laboratory findings obtained during the initial assessment are presented in Table 2. The available results showed elevated white blood cell and neutrophil values, together with reduced red blood cell count, hemoglobin, hematocrit, lymphocyte percentage, and eosinophil percentage. Other reported hematological parameters were within the reference ranges provided in the clinical record.

**Table 2.** Routine laboratory findings on the initial assessment

| No. | Parameter | Reference range | Unit                | Result | Interpretation |
|-----|-----------|-----------------|---------------------|--------|----------------|
| 1   | WBC       | 4.00 to 10.0    | 10 <sup>3</sup> /μL | 14.04  | High           |
| 2   | RBC       | 4.00 to 6.00    | 10 <sup>6</sup> /μL | 3.70   | Low            |
| 3   | HGB       | 12.0 to 16.0    | g/dL                | 10.7   | Low            |
| 4   | HCT       | 37.0 to 48.0    | %                   | 33     | Low            |
| 5   | MCV       | 80.0 to 97.0    | fL                  | 89     | Normal         |
| 6   | MCH       | 26.5 to 33.5    | pg                  | 29.0   | Normal         |
| 7   | MCHC      | 31.5 to 35.5    | g/dL                | 33     | Normal         |
| 8   | PLT       | 150 to 400      | 10 <sup>3</sup> /μL | 171    | Normal         |
| 9   | RDW-SD    | 37.0 to 54.0    | fL                  | 42.5   | Normal         |
| 10  | RDW-CV    | 10.0 to 15.0    | %                   | 13.3   | Normal         |
| 11  | PDW       | 10.0 to 18.0    | fL                  | 16.6   | Normal         |
| 12  | MPV       | 6.50 to 11.0    | fL                  | 11.7   | High           |
| 13  | P-LCR     | 13.0 to 43.0    | %                   | 29.0   | Normal         |
| 14  | PCT       | 0.15 to 0.50    | %                   | 0.20   | Normal         |
| 15  | NEUT      | 52.0 to 75.0    | %                   | 88.4   | High           |
| 16  | LYMPH     | 20.0 to 40.0    | %                   | 7.2    | Low            |
| 17  | MONO      | 2.00 to 8.00    | %                   | 4.4    | Normal         |
| 18  | RET       | 0.00 to 0.10    | 10 <sup>3</sup> /μL | 0      | Not elevated   |
| 19  | EO        | 1.00 to 3.00    | %                   | 0      | Low            |
| 20  | BASO      | 0.00 to 1.00    | %                   | 0      | Normal         |

WBC: white blood cell; RBC: red blood cell; HGB: hemoglobin; HCT: hematocrit; MCV: mean corpuscular volume; MCH: mean corpuscular hemoglobin; MCHC: mean corpuscular hemoglobin concentration; PLT: platelet; RDW-SD: red cell distribution width-standard deviation; RDW-CV: red cell distribution width-coefficient of variation; PDW: platelet distribution width; MPV: mean platelet volume; P-LCR: platelet large cell ratio; PCT: plateletcrit; NEUT: neutrophil; LYMPH: lymphocyte; MONO: monocyte; RET: reticulocyte; EO: eosinophil; BASO: basophil.

The physiotherapy program was implemented according to the patient's documented clinical condition. During the early intensive care phase, when the GCS score was 8, the documented interventions included therapeutic communication with the family, positioning, passive ankle pumping, and passive knee range of motion. Passive ankle pumping was performed using 8 counts for 3 repetitions over approximately 3 to 5 minutes, whereas passive knee range of motion was performed using 8 counts for 2 repetitions through the available range of motion for approximately 5 minutes. The documented intervention components and available dosage information are presented in Table 3.

**Table 3.** Documented physiotherapy program

| Clinical problem                                              | Intervention                 | Documented dose and progression                                                         |
|---------------------------------------------------------------|------------------------------|-----------------------------------------------------------------------------------------|
| Family anxiety related to the patient's condition             | Therapeutic communication    | Performed during treatment sessions through communication with the family               |
| Risk of pulmonary complications related to prolonged bed rest | Positioning                  | Performed during treatment sessions; head-up positioning or repositioning documented    |
| Risk of ankle and foot edema related to immobilization        | Passive ankle pumping        | 8 counts, 3 repetitions, approximately 3 to 5 minutes                                   |
| Risk of knee joint stiffness related to immobilization        | Passive knee range of motion | 8 counts, 2 repetitions, through the available range of motion, approximately 5 minutes |

Complete dosage parameters for all intervention components were not available. No quantitative edema measurement was performed.

Clinical progression throughout the observation period is summarized in Table 4. The documented sequence demonstrates progression from passive interventions during reduced consciousness toward breathing exercises, coughing exercises, sitting, active assisted knee exercise, standing, and active ankle pumping as the patient's clinical condition changed.

**Table 4.** Timeline of surgery, physiotherapy sessions, and documented clinical progression

| Date and setting               | Documented clinical condition                                                                   | Documented physiotherapy intervention                                                                                            |
|--------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 29 August 2025, operating room | Mitral valve replacement under general anesthesia                                               | No physiotherapy intervention documented                                                                                         |
| 31 August 2025, ICU            | GCS 8                                                                                           | Therapeutic communication with family, positioning, passive ankle pumping, passive knee range of motion                          |
| 1 September 2025, ICU          | Clinical condition remained under intensive care management                                     | Positioning, passive ankle pumping, passive knee range of motion                                                                 |
| 2 September 2025, HCU          | GCS 14; head-up position 70°; active and passive joint movement documented within normal limits | Breathing exercise, coughing exercise, and sitting were documented                                                               |
| 3 September 2025, HCU          | Clinical condition documented as more stable; muscle strength grade 4 in the documented regions | Sitting activity and active assisted knee exercise were documented                                                               |
| 5 September 2025, HCU          | GCS 15                                                                                          | Standing activity and active ankle pumping were documented; breathing exercise and active assisted knee exercise were maintained |

ICU: intensive care unit; HCU: high care unit; GCS: Glasgow Coma Scale.

The final documented assessment was performed on 5 September 2025. Clinical and functional outcomes recorded at the initial and final assessments are presented in Table 5. The GCS increased from 8 to 15, SpO<sub>2</sub> increased from 97% to 99%, and respiratory rate decreased from 27 to 25 breaths/minute. Blood pressure and heart rate also changed between the two assessment points. The Barthel Index increased from 5 to 11, Borg CR10 decreased from 3 to 1, HARS decreased from 29 to 22, and MET increased from 1 to 2. NYHA classification was recorded as class II at the initial assessment and class III at the final assessment, whereas Killip classification remained class I.

**Table 5.** Documented clinical and functional outcomes

| Outcome               | Initial assessment, 31 August 2025 | Final assessment, 5 September 2025               |
|-----------------------|------------------------------------|--------------------------------------------------|
| Glasgow Coma Scale    | 8                                  | 15                                               |
| Blood pressure        | 137/76 mmHg                        | 141/91 mmHg                                      |
| SpO <sub>2</sub>      | 97%                                | 99%                                              |
| Heart rate            | 80 beats/minute                    | 84 beats/minute                                  |
| Respiratory rate      | 27 breaths/minute                  | 25 breaths/minute                                |
| Joint movement        | Not assessable                     | Active and passive movement within normal limits |
| Muscle strength       | Not assessable                     | Grade 4 in documented regions                    |
| NYHA classification   | Class II                           | Class III                                        |
| Killip classification | Class I                            | Class I                                          |
| Barthel Index         | 5                                  | 11                                               |
| Borg CR10             | 3                                  | 1                                                |
| HARS                  | 29                                 | 22                                               |
| MET                   | 1                                  | 2                                                |

SpO<sub>2</sub>: peripheral oxygen saturation; NYHA: New York Heart Association; HARS: Hamilton Anxiety Rating Scale; MET: metabolic equivalent of task.

No adverse events were reported during the five documented physiotherapy sessions according to the author confirmation. No written patient perspective regarding the physiotherapy experience, symptoms, or perceived benefit was available. No clinical follow up, discharge information, or additional outcome assessment after 5 September 2025 was available. Therefore, the reported findings represent the documented clinical course from 31 August to 5 September 2025 and do not describe longer term postoperative outcomes.

## Discussion

This case report describes the documented clinical course of a 54 year old woman with rheumatic heart disease and multiple valvular abnormalities following mitral valve replacement. During the observation period from 31 August to 5 September 2025, the patient progressed from reduced consciousness, with a Glasgow Coma Scale (GCS) score of 8, to a GCS score of 15. Physiotherapy management progressed from positioning, passive ankle pumping, and passive knee range of motion to breathing and coughing exercises, sitting, active assisted knee exercise, standing, and active ankle pumping. This progression occurred during the immediate postoperative period alongside surgical recovery, intensive and high care management, and ongoing medical treatment. Therefore, the observed changes cannot be attributed solely to physiotherapy.

The initial physiotherapy assessment was performed when the patient remained in the intensive care unit with reduced consciousness. At this stage, active participation in functional exercise and comprehensive physical assessment was limited. The documented physiotherapy management therefore focused on positioning and passive lower extremity movement. Passive ankle pumping and knee range of motion were used within the available treatment documentation to maintain movement during a period of limited active participation. As the patient's documented level of consciousness improved, additional interventions involving breathing, coughing, sitting, active assisted knee exercise, standing, and active ankle pumping were introduced. This staged progression reflects the need to adapt early postoperative rehabilitation to the patient's changing clinical and functional condition rather than applying a uniform intervention to all patients.<sup>5</sup>

The improvement in GCS from 8 to 15 represented the most clearly documented change in neurological status during the observation period. However, recovery of consciousness after cardiac surgery may be influenced by several factors, including the resolution of anesthetic effects, postoperative physiological stabilization, intensive care management, medical treatment, and the natural recovery process. Consequently, the temporal occurrence of physiotherapy progression alongside improved consciousness should not be interpreted as evidence that physiotherapy caused the neurological improvement. Instead, the improvement in consciousness enabled a broader range of physiotherapy activities to be introduced as the patient became increasingly able to participate.

Respiratory findings also changed during the documented period. Peripheral oxygen saturation increased from 97% to 99%, whereas respiratory rate decreased from 27 to 25 breaths/minute. Breathing and coughing exercises were introduced after improvement in consciousness and joint movement. These interventions are commonly incorporated into early postoperative rehabilitation to support respiratory function and facilitate airway clearance after thoracic or cardiac surgery.<sup>5</sup> Nevertheless, the changes observed in this case were modest and occurred concurrently with routine postoperative and medical management. The available data do not include repeated pulmonary function testing, quantitative secretion assessment, or systematic evaluation of postoperative pulmonary complications. Therefore, these findings should be interpreted as descriptive changes in respiratory status rather than evidence of a specific therapeutic effect.

Functional status also changed across the documented assessments. The Barthel Index increased from 5 to 11, while the Borg CR10 score decreased from 3 to 1. In addition, standing and active lower extremity exercise were documented at the final assessment, whereas the initial assessment was limited by reduced consciousness. These findings are consistent with an increase in the patient's documented capacity to participate in basic movement and rehabilitation activities. However, the available observation period was short, and functional recovery after mitral valve surgery is influenced by multiple concurrent factors. The present findings therefore describe changes observed during early postoperative recovery and should not be interpreted as demonstrating the independent effectiveness of the physiotherapy program.

The Hamilton Anxiety Rating Scale score changed from 29 to 22 during the observation period. Although this numerical difference was documented, the case report cannot determine whether the change was related to physiotherapy, clinical stabilization, communication with health professionals and family, relief following surgery, or other aspects of postoperative care. Similarly, the MET value increased from 1 to 2 during the observation period. These changes may indicate a difference in the documented clinical status, but the short observation period and absence of repeated standardized testing procedures limit interpretation of their clinical significance.

The NYHA classification was recorded as class II at the initial assessment and class III at the final assessment, whereas the Killip classification remained class I. The change in NYHA classification should be reported as documented and interpreted cautiously. Because the available records did not provide detailed information regarding the assessment procedure, activity context, or rationale underlying the classification at each time point, the observed change cannot be interpreted as a longitudinal indicator of improvement or deterioration without additional clarification. Similarly, the unchanged Killip classification indicates that the patient was recorded as class I at both documented assessments but does not establish the effect of physiotherapy on cardiac status.

No adverse events were reported during the five documented physiotherapy sessions. This finding indicates that no untoward events were identified within the available treatment records and author confirmation. However, the absence of reported adverse events in a single case with a short observation period should not be interpreted as evidence of the general safety of the intervention. Larger studies with standardized monitoring and longer follow up are required to evaluate the safety and clinical effects of specific rehabilitation strategies after mitral valve surgery.<sup>10</sup>

The clinical relevance of this case lies primarily in the description of physiotherapy progression during the immediate postoperative period. The available documentation shows that intervention selection changed as the patient's documented consciousness and physical capacity changed. This approach is consistent with the general principle that early postoperative rehabilitation should be individualized according to clinical stability, functional capacity, and the patient's ability to participate.<sup>7</sup> However, this report does not establish an optimal intervention protocol because several treatment parameters were unavailable, and the documented progression was based on a single clinical course.

The interpretation of this case is also limited by its observational nature. Only one patient was described, no control or comparison group was available, and the observation period ended on 5 September 2025 without additional follow up or discharge information. Several outcomes were influenced by incomplete baseline information, including joint movement and muscle strength, which could not be directly compared between the initial and final assessments. In addition, the patient received concurrent surgical, intensive care, and medical management, creating substantial potential for confounding. These factors limit causal attribution, restrict generalizability, and require cautious interpretation of all observed changes.

Overall, this case provides a descriptive account of the patient's early postoperative clinical course and the accompanying progression of physiotherapy management. The observed changes in consciousness, respiratory status, selected clinical scores, and functional participation occurred during the period in which physiotherapy was provided. However, these changes should be interpreted within the broader context of postoperative recovery and concurrent multidisciplinary care. The principal clinical lesson is that physiotherapy management during the early phase after mitral valve replacement may require staged adaptation to the patient's documented level of consciousness and functional capacity rather than a fixed intervention sequence.

## Conclusion

This case report describes the clinical course and staged physiotherapy management of a patient with rheumatic heart disease following mitral valve replacement during the immediate postoperative period. Physiotherapy progressed from positioning and passive lower extremity exercises during reduced consciousness to breathing and coughing exercises, sitting, active assisted knee exercise, standing, and active ankle pumping as the patient's documented clinical condition changed.

During the observation period from 31 August to 5 September 2025, changes were documented in consciousness, respiratory status, functional scores, perceived exertion, anxiety score, and estimated metabolic capacity. The Glasgow Coma Scale increased from 8 to 15, peripheral oxygen saturation increased from 97% to 99%, respiratory rate decreased from 27 to 25 breaths/minute, the Barthel Index increased from 5 to 11, Borg CR10 decreased from 3 to 1, Hamilton Anxiety Rating Scale decreased from 29 to 22, and metabolic equivalents increased from 1 to 2. However, these changes occurred concurrently with postoperative recovery, surgical management, intensive care, and medical treatment.

Therefore, the findings should be interpreted as a descriptive account of the patient's clinical progression and accompanying physiotherapy management rather than evidence of treatment effectiveness or a causal effect of physiotherapy. The principal clinical implication is that physiotherapy during the early phase after mitral valve replacement may require staged adaptation according to the patient's documented level of consciousness and functional capacity.

Longer follow up, more complete baseline and repeated outcome assessments, and comparative studies are required to better evaluate the contribution of specific physiotherapy interventions to postoperative recovery and functional outcomes.

## Author Contribution

Nurfadillah: Conceptualization, Methodology, Investigation, Data Curation, Formal Analysis, Writing Original Draft, Visualization.

Andi Rizky Arbaim Hasyar: Conceptualization, Methodology, Supervision, Validation, Writing Review and Editing.

Ismail Muhammad: Investigation, Methodology, Clinical Supervision, Validation, Writing Review and Editing.

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## Conflict of Interest Statement

The authors declare that they have no competing interests or conflicts of interest related to this case report.

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## Ethics Statement

Written informed consent was obtained for the publication of this case report and the accompanying clinical information. No patient identifying information is included in the manuscript.

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