Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

From Bed to Walking: The Impact of a Multidisciplinary Approach in Intensive Care – A Case Report

Ignazio Geraci
IRCCS ISMETT
Sergio Sciacca
IRCCS ISMETT
Danilo Terzo
IRCCS ISMETT
Paolo Paratore
IRCCS ISMETT
Alessia Ippolito
IRCCS ISMETT
Filippo Maselli
Sapienza University of Rome
Lorenzo Storari
Sapienza University of Rome
Giovanna Panarello
IRCCS ISMETT
Giuseppe Enea
genea@ismett.edu

IRCCS ISMETT

Research Article

Keywords: intensive care unit-acquired weakness, advanced heart failure, left ventricular assist device, physiotherapy, functional recovery

Posted Date: June 28th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9940866/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Introduction

This case report details the remarkable recovery of a critically ill 52-year-old male with end-stage heart failure supported by a left ventricular assist device (LVAD). The patient presented with severe ICU-acquired weakness (ICU-AW), had multiple comorbidities, and required prolonged mechanical ventilation. His case was marked by extreme clinical complexity, including hemodynamic instability, recurrent sepsis, mechanical ventilation dependency, an initial Medical Research Council (MRC) strength of 2/5, and an ICU Mobility Scale (IMS) score of 0. Rehabilitation was initially contraindicated.

Patient's Main Concerns and Clinical Findings

The patient expressed profound fears of becoming permanently dependent and losing dignity after being admitted for acute abdominal pain and shock following bowel resection with stoma formation, complicated by paralytic ileus. Key findings included generalized hypotrophy, symmetrical limb weakness (MRC 2/5), diminished reflexes, ventilator dependency via tracheostomy, VAD-related hemodynamic constraints, anemia, and elevated inflammatory markers. These findings were compounded by prior stroke and device infections.

Primary Diagnoses, Interventions, and Outcomes

Primary diagnosis was severe ICU-AW in an LVAD recipient with sepsis and multi-organ dysfunction. Interventions included 49 physiotherapy sessions (passive mobilization progressing to walker-assisted walking) and 28 respiratory therapy sessions (bronchial clearance, muscle training, tracheostomy care), coordinated by a multidisciplinary team from January 30 to April 1, 2025. Outcomes featured muscle strength gains to MRC 4/5 and IMS improvement from 0 to 8, enabling ambulation. Tracheostomy decannulation was performed on March 10, 2025, with no adverse events, and there were sustained outpatient gains in endurance, quality of life, and psychological well-being.

Conclusion

Proactively preparing for rehabilitation through serial reassessment helps identify the earliest safe intervention window, even when initially contraindicated. Synergizing physiotherapy and respiratory therapy within multidisciplinary teams can amplify recovery in complex ICU cases, while fostering hope, patient engagement, and team motivation, and redefining limits in seemingly hopeless prognoses.

Background and Purpose

Critical illness, characterized by compromised physiological function due to conditions such as sepsis, multi-organ failure, or advanced cardiovascular disease, often results in significant physical and functional impairments [1,2]. Among these, intensive care unit-acquired weakness (ICU-AW) is a common complication in ICU patients [3], marked by generalized muscle weakness due to prolonged

immobility, systemic inflammation, and metabolic derangements [4]. ICU-AW encompasses critical illness polyneuropathy, critical illness myopathy, or a combination of both, resulting from nerve and muscle dysfunction induced by critical illness [5]. Approximately 30–50% of ICU patients are affected by ICU-AW, with a higher prevalence in those with prolonged mechanical ventilation (> 7 days), sepsis, or multi-organ dysfunction [3,6,7]. Risk factors include personal factors (e.g., advanced age and female sex), disease-related factors (e.g., sepsis or shock), treatment-related factors (e.g., analgesia, vasoactive medication, steroids and sedation), and laboratory indicators (e.g., electrolyte and lactate levels) [3,8].

The condition significantly increases length of stay in ICU and hospital, with up to 25% of affected patients experiencing persistent functional deficits one year post-discharge [9–11]. ICU-AW typically presents with symmetrical muscle weakness, reduced deep tendon reflexes, and impaired functional mobility [12,13]. Patients may have difficulty weaning from mechanical ventilation and experience challenges with basic activities of daily living, contributing to long-term dependency [10].

Management of ICU-AW involves both medical and physical therapy strategies [14]. Medically optimizing nutrition, controlling hyperglycemia, minimizing sedation, and addressing underlying infections or organ dysfunction are critical to reducing muscle catabolism and supporting recovery [15]. Physiotherapy, particularly early mobilization, is a cornerstone treatment, with evidence demonstrating reduced muscle atrophy, improved strength, and shorter ICU stays [16–19]. Despite promising outcomes, early physiotherapy is often delayed or contraindicated in patients with hemodynamic instability, recent major surgery (e.g., abdominal or cardiovascular procedures), or complications such as infections or neurological events [20–22].

This case report presents the complex clinical course of a 52-year-old male patient with advanced heart failure, managed by a left ventricular assist device (LVAD), and multiple comorbidities, who developed ICU-AW following a complicated ICU stay. Through his recovery pathway, we highlight the challenges of implementing physiotherapy in the context of clinical contraindications and underscore the key role of a multidisciplinary team in optimizing outcomes. Even in the face of a prognosis described as a “hopeless condition”, the timely and synergistic activation of multidisciplinary rehabilitation can redefine the limits of what is possible in critically ill patients. Collaborating with intensivists, cardiologists, surgeons, and nurses has enabled physiotherapy to overcome clinical and organizational barriers, offering the patient a real possibility to regain autonomy and dignity.

Case Description

This case report was written according to the CARE guidelines [23], and the authors obtained written informed consent from the patient.

A 52-year-old Caucasian male, weighing 70 kg and standing 168 cm tall (BMI 24.8 kg/m²), was admitted to the intensive care unit (ICU) of ISMETT on November 8, 2024, following transfer from a peripheral hospital due to severe abdominal pain and hemodynamic instability. Medical history was marked by advanced dilated hypokinetic cardiomyopathy diagnosed in 2008, with a left ventricular ejection fraction

(LVEF) of 18% and mild right ventricular dysfunction. Multiple comorbidities included hypertension, insulin-dependent type 2 diabetes, stage 3b chronic kidney disease, and anxiety disorder managed with prazene and reboxetine; The patient was also a former smoker. An ICD was implanted in 2019 and was later replaced by a CRT-D in 2022 due to infection. On March 3, 2024, he received an LVAD implantation, preceded by intra-aortic balloon pump (IABP) placement to support hemodynamic stability; the procedure was complicated by an ischemic stroke, from which he achieved neurological recovery in the subsequent days. On June 8, 2024, the patient underwent right hemicolectomy with ileocolic anastomosis and protective ileostomy for pneumatosis intestinalis of the right and proximal transverse colon. The postoperative course was complicated by anemia, transfusions, and a Klebsiella pneumoniae bloodstream infection.

Clinical Findings and Initial Course

In November 2024, the patient was admitted with severe acute abdominal pain and transferred to the ICU for hemodynamic instability. He required vasopressor support, mechanical ventilation via tracheostomy on 22 November, and continuous sedation. Laboratory tests showed CRP > 100 mg/dL and mild renal impairment (creatinine 2.6–3 mg/dL).

In the early phase, treatment priorities included hemodynamic stabilization under VAD monitoring, infection control, nutritional optimization with high-protein enteral feeding, and gradual reduction of sedation. Physiotherapy was initially deferred during the unstable phase, but the patient was closely monitored to identify the earliest safe window for initiation.

An initial physical examination showed generalized weakness, hypotonia, reduced spontaneous limb movements, and diminished deep tendon reflexes, consistent with severe ICU-acquired weakness. Muscle strength was graded 2/5 on the MRC scale in both the upper and lower extremities. After three weeks, improved cardiovascular and respiratory stability allowed the initiation of passive mobilization, marking the beginning of rehabilitation.

Therapeutic Interventions

The rehabilitation program included physiotherapy (PT) and respiratory therapy (RT), tailored to the patient’s complex condition. RT was organized within the physiotherapy service according to a North American-style model. All interventions were delivered in close collaboration with a multidisciplinary team to ensure safety and maximize engagement. Rehabilitation progressed from passive mobilization during the unstable phase to assisted exercises, bedside sitting, standing, and walking. The respiratory component addressed muscle weakness and ventilator dependency, culminating in tracheostomy decannulation. The weekly rehabilitation time reflects the treatment that was delivered, which was sometimes less than daily because of fluctuating clinical conditions and service constraints.

Accordingly, the mean weekly time reported in the activity-progression table represents the total accumulated treatment time over each week, rather than a fixed 5-day average (2 days before and 2 days after the time point) used in the graphical trend.

The PT intervention started on January 30, 2025, shortly after clinical stabilization, and included 49 sessions over approximately two months. The initial focus was on passive mobilization to prevent joint stiffness and muscle atrophy in the setting of severe ICU-AW. Rehabilitation then progressed through active-assisted mobilization, supine-to-sitting and sitting-to-standing transfers, seated cycle ergometry, and, finally, walker-assisted ambulation. Session duration ranged from 30 to 60 minutes according to tolerance and daily clinical status. Treatment was continuously adjusted by a multidisciplinary team based on the patient's clinical and functional evolution, which was assessed with the ICU Mobility Scale (IMS) and improved gradually over time [19]. A synopsis of this episode of care is shown in the timeline (Figure 1).

Concurrently, RT began on January 30, 2025, and included 28 sessions over approximately 2 months. The program aimed to improve respiratory muscle weakness, pulmonary function, secretion clearance, and ventilator/tracheostomy weaning after prolonged ICU stay. Initial sessions focused on bronchial clearance and breathing control exercises, followed by progressive respiratory muscle training to support ventilator weaning. The weaning process was gradual, starting with ventilator disconnection and progressively longer PEEP-valve cycles until the transition to oxygen therapy alone was made. Interventions included positive-pressure therapy with an Acapella device, breath-stacking exercises with an Ambu bag, and postural drainage. Tracheostomy care was essential to prevent complications and facilitate PEEP-valve removal, speaking-valve trials, tracheostomy closure, and successful decannulation on March 10, 2025. Radiological findings were unremarkable except for a pleural effusion that did not require thoracentesis, and no respiratory infections occurred.

PT and RT were integrated into the overall care plan through continuous multidisciplinary coordination. Regular input from physicians, the psychologist, and the VAD coordinator ensured that rehabilitation was aligned with cardiovascular stability, LVAD management, and surgical constraints related to the recent hemicolectomy and ileostomy. Nursing staff contributed by monitoring treatment response, managing pain, and facilitating safe transitions between activities. This collaborative approach ensured clinical safety, supported patient engagement, and enabled steady functional recovery despite the complexity of the case.

Figure 1 Timeline

Figure 1: Timeline of rehabilitation interventions and clinical parameters. The x-axis shows intervention dates. The y-axis reports ICU Mobility Scale (IMS) scores, rehabilitation time (PT and RT), and reduction in FiO_2 (L/min). Dashed lines indicate temporal trends for IMS, intervention time, and FiO_2 over time. IMS ranges from 1 to 10. Intervention time is the mean daily duration over 5 days (2 days before and 2 days after) divided by 10. FiO_2 is the delivered oxygen flow rate (L/min), adjusted by subtracting the room-air oxygen equivalent and then dividing by 4 to match the scale of the other variables. Key clinical time

points are indicated: t1 (11/02, first sitting at edge of bed), t2 (12/02, PEEP valve use for 6 h per shift), t3 (19/02, first standing), t4 (20/02, tracheostomy capping), t5 (24/02, clinical deterioration [sepsis]), t6 (05/03, swallow test passed), t7 (10/03, decannulation), t8 (14/03, first ambulation).

Table 1 Weekly Physical Therapy and Respiratory Therapy Interventions

Period (week)	*PT Interventions*	*RT Interventions*	*Avg. Daily Commitment (min)*	*Achieved Outcome*
1	Assessment, passive mobilization	Assessment passive mobilization, ventilator weaning, airway clearance	42.1	Bedside activities
2	Passive mobilization, supine-to-sitting transition	Ventilator weaning, airway clearance, postural drainage	47.1	Sitting at edge of bed (EOB), transfer to ward
3	Active-assisted mobilization, supine-to-sitting transition, sitting-to-standing transition	Ventilator weaning, airway clearance, postural drainage, PEEP weaning, speaking valve trial, lung recruitment with Ambu bag, endotracheal suctioning	67.1	Standing position, PEEP valve maintained 6 h/shift, nocturnal ventilation only
4	Active-assisted mobilization, supine-to-sitting transition, sitting-to-standing transition, cycle ergometer (seated)	Postural drainage, tracheostomy weaning, airway clearance, Acapella exercises, swallowing assessment	67.9	Standing maintenance, conditioning initiation, tracheostomy cap application
5	Active-assisted mobilization, supine-to-sitting transition, sitting-to-standing transition	Tracheostomy weaning, airway clearance, swallowing test	57.1	Resumption of oral feeding
6	Active-assisted mobilization, supine-to-sitting transition, sitting-to-standing transition, cycle ergometer (seated)	Acapella exercises, decannulation assessment, decannulation with patient education	55	Walker-assisted ambulation resumption, speaking valve tolerance, decannulation
7	Supine-to-sitting transition, sitting-to-standing transition, cycle ergometer (seated), walker-assisted ambulation with support	Monitoring	42.9	Increased exercise tolerance

8	Supine-to-sitting transition, sitting-to-standing transition, cycle ergometer (seated), walker-assisted ambulation with support	Monitoring	44.3	Increased walking distance with walker and support
9	Supine-to-sitting transition, sitting-to-standing transition, cycle ergometer (seated), walker-assisted ambulation with support	-	45	Hospital transfer for ongoing rehabilitation

Table 1: Weekly values indicate the actual mean daily rehabilitation time delivered during each week, not a 5-day averaged estimate

Follow-up and Outcomes

After two months of integrated motor and respiratory rehabilitation, the patient showed progressive functional improvement. MRC strength increased to 4/5 in both upper and lower limbs, and IMS [24] improved from 0 at baseline to 8 at discharge from intensive physiotherapy. This allowed the patient to undergo supervised transfers and walker-assisted ambulation. Respiratory autonomy was achieved through tracheostomy decannulation, a stable room-air SpO_2 of 98%, and an effective cough reflex. These outcomes indicated a reduction in ICU-acquired weakness and respiratory dependency. No adverse events occurred, and adherence improved over time thanks to continuous multidisciplinary communication, family support, individualized treatment adjustments, and progressive session complexity. The patient continued outpatient physiotherapy with a focus on endurance and balance, and reported subjective gains in quality of life, emotional well-being, and dignity.

This case highlights that successful rehabilitation in critical care settings depends not only on clinical parameters but also on team coordination, timing, and confidence in the patient's recovery potential. Despite prolonged immobility and an initially poor prognosis, coordinated rehabilitation initiated after clinical stabilization led to meaningful recovery. Key lessons include the value of serial reassessments to identify a therapeutic window, the synergy between PT and RT, and the importance of the recovery narrative in supporting both patient engagement and team motivation.

Discussion

This case highlights that rehabilitation in critical care depends not only on clinical status but also on multidisciplinary coordination and appropriate timing. In a patient with advanced mechanical cardiac support and a complex surgical history, the integrated contribution of intensivists, cardiologists, surgeons, nurses, physiotherapists, and respiratory therapists enabled rehabilitation to begin as soon as clinical stability permitted and to progress safely over time.

Despite prolonged immobility and a poor initial prognosis, individualized and progressively adapted motor and respiratory rehabilitation resulted in substantial functional recovery. Serial reassessment was essential, especially when rehabilitation initially appeared to be contraindicated. The case also underscores the reciprocal relationship between respiratory stability and mobilization, as well as the importance of combining technical intervention with continuous team communication and patient engagement.

Compared with published studies on early ICU mobilization [25–27], this case suggests that structured multidisciplinary collaboration can achieve meaningful outcomes even in highly complex patients.

Intensive rehabilitation in the ICU cannot be confined to rigid protocols; rather, it requires attentive listening, continuous adaptation, and trust in the potential of each individual patient. Our patient's recovery exemplifies how the synergy among professionals, continuous reassessment, and collective commitment are pivotal in expanding the horizons of practice, restoring not only physical function but also hope and dignity. The take-home message for daily clinical practice is simple yet powerful: it is imperative to prepare for rehabilitation rather than passively awaiting its onset. Furthermore, it is crucial to invest in multidisciplinary teamwork and to maintain a positive outlook toward the patient, even when all appears to be lost.

Key Message

Structured multidisciplinary rehabilitation, guided by reassessment and team synergy, can achieve meaningful functional recovery and psychological benefits in critically ill patients deemed to have no chance of recovery. This highlights the expanded role of physiotherapy in complex ICU scenarios.

Patient's Perspective

The turning points — the first time sitting up, standing, walking, and managing the tracheostomy — were not simply clinical steps but true motivational milestones, capable of reactivating the patient's hope and commitment and strengthening the team's cohesion.

Human Value

The patient's functional recovery was concomitant with an increase in motivation, as evidenced by the patient's words: "The first time I stood up, I realized I was alive, not just surviving."

This testimony elucidates the emotional dimension of rehabilitation, emphasizing how the journey encompasses relationships, trust, and rediscovery of self.

Abbreviations

ICU
AW-intensive care unit-acquired weakness
LVAD
left ventricular assist device
ICU
intensive care unit
LVEF
left ventricular ejection fraction
IABP
intra-aortic balloon pump
PT
physiotherapy
RT
respiratory therapy
IMS
ICU Mobility Scale
EOB
edge of bed

Declarations

Ethics approval and consent to participate

Ethical approval was not required for this case report in accordance with national guidelines for case reports.

Consent for publication

Written informed consent was obtained from the patient for publication of this report and accompanying data, in accordance with the CARE guidelines [23].

Funding

Not applicable

Author Contribution

GE and IG conceptualized the case report and contributed to data analysis and interpretation. IG and AI collected clinical data related to the patient's clinical course and rehabilitation. GE and IG drafted the initial version of the manuscript and prepared the tables and figures. Clinical supervision of the patient was provided by DT and PP. FM, LS, GP and SS contributed to critical revision of the manuscript for important intellectual content, reviewing the clinical description and rehabilitation narrative. All authors reviewed and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

Acknowledgement

The authors wish to acknowledge the commitment of the following colleagues who contributed to the clinical care of the patient: Matteo Mannino, Aurelio Speciale, Andrea Lo Nigro, Melania Ventimiglia, Massimiliano Pensabene, Isabelle Duca, Vincenzo Sanfilippo, Christian Priano, and Chiara Albano. Their dedication and teamwork were essential to the patient's treatment and recovery process.

Availability of data and material

The datasets supporting the conclusions of this article are not publicly available due to privacy and ethical restrictions, but de-identified summary data are included within the article and its supplementary materials. Further details may be requested from the corresponding author on reasonable request, subject to institutional and ethical approvals.

Competing interests

The authors declare that they have no competing interests

References

1. Christensen M, Liang M. Critical care: A concept analysis. Int J Nurs Sci. 2023;10:403–13. https://doi.org/10.1016/j.ijnss.2023.06.020.
2. Kayambankadzanja RK, Schell CO, Gerdin Wärnberg M, Tamras T, Mollazadegan H, Holmberg M, et al. Towards definitions of critical illness and critical care using concept analysis. BMJ Open. 2022;12:e060972. https://doi.org/10.1136/bmjopen-2022-060972.
3. Hiser SL, Casey K, Nydahl P, Hodgson CL, Needham DM. Intensive care unit acquired weakness and physical rehabilitation in the ICU. BMJ. 2025;388:e077292. https://doi.org/10.1136/bmj-2023-077292.
4. Vanhorebeek I, Latronico N, Van Den Berghe G. ICU-acquired weakness. Intensive Care Med. 2020;46:637–53. https://doi.org/10.1007/s00134-020-05944-4.

5. Jolley SE, Bunnell AE, Hough CL, ICU-Acquired Weakness. Chest. 2016;150:1129–40. https://doi.org/10.1016/j.chest.2016.03.045.
6. Griffiths RD, Hall JB. Intensive care unit-acquired weakness. Crit Care Med. 2010;38:779–87. https://doi.org/10.1097/CCM.0b013e3181cc4b53.
7. Appleton RT, Kinsella J, Quasim T. The incidence of intensive care unit-acquired weakness syndromes: A systematic review. J Intensive Care Soc. 2015;16:126–36. https://doi.org/10.1177/1751143714563016.
8. Zhang Y, Hu Q, Zhou M, Wang Y, Yang J, Jin X, et al. Risk factors for acquired weakness in intensive care unit patients: An umbrella review. Intensive Crit Care Nurs. 2025;88:103940. https://doi.org/10.1016/j.iccn.2025.103940.
9. Van Der Schaaf M, Beelen A, De Vos R. Functional outcome in patients with critical illness polyneuropathy. Disabil Rehabil. 2004;26:1189–97. https://doi.org/10.1080/09638280410001724861.
10. Semmler A, Okulla T, Kaiser M, Seifert B, Heneka MT. Long-term neuromuscular sequelae of critical illness. J Neurol. 2013;260:151–7. https://doi.org/10.1007/s00415-012-6605-4.
11. Stevens RD, Dowdy DW, Michaels RK, Mendez-Tellez PA, Pronovost PJ, Needham DM. Neuromuscular dysfunction acquired in critical illness: a systematic review. Intensive Care Med. 2007;33:1876–91. https://doi.org/10.1007/s00134-007-0772-2.
12. Latronico N, Gosselink R. A guided approach to diagnose severe muscle weakness in the intensive care unit. Revista Brasileira de Terapia Intensiva [Internet]. 2015 [cited 2026 Apr 16];27. https://doi.org/10.5935/0103-507X.20150036
13. Godoy DA, Vaz De Mello L, Masotti L, Di Napoli M. Intensive Care Unit Acquired Weakness (ICU-AW): a brief and practical review. RHC. 2015;6:9–35. https://doi.org/10.7175/rhc.v6i1.1037.
14. Nordon-Craft A, Moss M, Quan D, Schenkman M. Intensive Care Unit–Acquired Weakness: Implications for Physical Therapist Management. Phys Ther. 2012;92:1494–506. https://doi.org/10.2522/ptj.20110117.
15. Hermans G, Van Den Berghe G. Clinical review: intensive care unit acquired weakness. Crit Care. 2015;19:274. https://doi.org/10.1186/s13054-015-0993-7.
16. Adler J, Malone D. Early mobilization in the intensive care unit: a systematic review. Cardiopulm Phys Ther J. 2012;23:5–13.
17. Zang K, Chen B, Wang M, Chen D, Hui L, Guo S, et al. The effect of early mobilization in critically ill patients: A meta-analysis. Nurs Crit Care. 2020;25:360–7. https://doi.org/10.1111/nicc.12455.
18. Rosa D, Negro A, Marcomini I, Pendoni R, Albabesi B, Pennino G, et al. The Effects of Early Mobilization on Acquired Weakness in Intensive Care Units: A Literature Review. Dimens Crit Care Nurs. 2023;42:146–52. https://doi.org/10.1097/DCC.0000000000000575.
19. Zhang L, Hu W, Cai Z, Liu J, Wu J, Deng Y et al. Early mobilization of critically ill patients in the intensive care unit: A systematic review and meta-analysis. Patman S, editor. PLoS ONE. 2019;14:e0223185. https://doi.org/10.1371/journal.pone.0223185

20. Borges LF, Fraga Righetti R, De Souza Francisco D, Pereira Yamaguti W, Barros CFD. Hemodynamic impact of early mobilization in critical patients receiving vasoactive drugs: A prospective cohort study. Ceruti S, editor. PLoS ONE. 2022;17:e0279269. https://doi.org/10.1371/journal.pone.0279269
21. Alaparthi GK, Gatty A, Samuel SR, Amaravadi SK. Effectiveness, Safety, and Barriers to Early Mobilization in the Intensive Care Unit. Plackett T, editor. Critical Care Research and Practice. 2020;2020:1–14. https://doi.org/10.1155/2020/7840743
22. Black C, Sanger H, Battle C, Eden A, Corner E. Feasibility of mobilisation in ICU: a multi-centre point prevalence study of mobility practices in the UK. Crit Care. 2023;27:217. https://doi.org/10.1186/s13054-023-04508-4.
23. Gagnier JJ, Kienle G, Altman DG, Moher D, Sox H, Riley D, et al. The CARE guidelines: consensus-based clinical case reporting guideline development. BMJ Case Rep. 2013;2013:bcr2013201554. https://doi.org/10.1136/bcr-2013-201554.
24. Tipping CJ, Bailey MJ, Bellomo R, Berney S, Buhr H, Denehy L, et al. The ICU Mobility Scale Has Construct and Predictive Validity and Is Responsive. A Multicenter Observational Study. Annals Am Thorac Soc. 2016;13:887–93. https://doi.org/10.1513/AnnalsATS.201510-717OC.
25. Schweickert WD, Pohlman MC, Pohlman AS, Nigos C, Pawlik AJ, Esbrook CL, et al. Early physical and occupational therapy in mechanically ventilated, critically ill patients: a randomised controlled trial. Lancet Lond Engl. 2009;373:1874–82. https://doi.org/10.1016/S0140-6736(09)60658-9.
26. Tominaga T, Nonaka T, Takeshita H, Honda Y, Nagura H, Shiraishi T, et al. A case of intensive care unit-acquired weakness after emergency surgery for acute abdomen. Int J Surg Case Rep. 2016;24:131–4. https://doi.org/10.1016/j.ijscr.2016.05.038.
27. Gustavo Piech Ricardo. Muscle Weakness Acquired in the Intensive Care Unit: Case Report. Ricardo GP, Almeida da Silva LS, Marques MT, Oliveira Valerio BC, Scalissi NM, Lima Junior JV et al. Muscle Weakness Acquired in the Intensive Care Unit: Case Report Clin Case Rep Int 2020; 4: 1181. Clinical Case Reports International - Endocrinology; 2020.

Figures

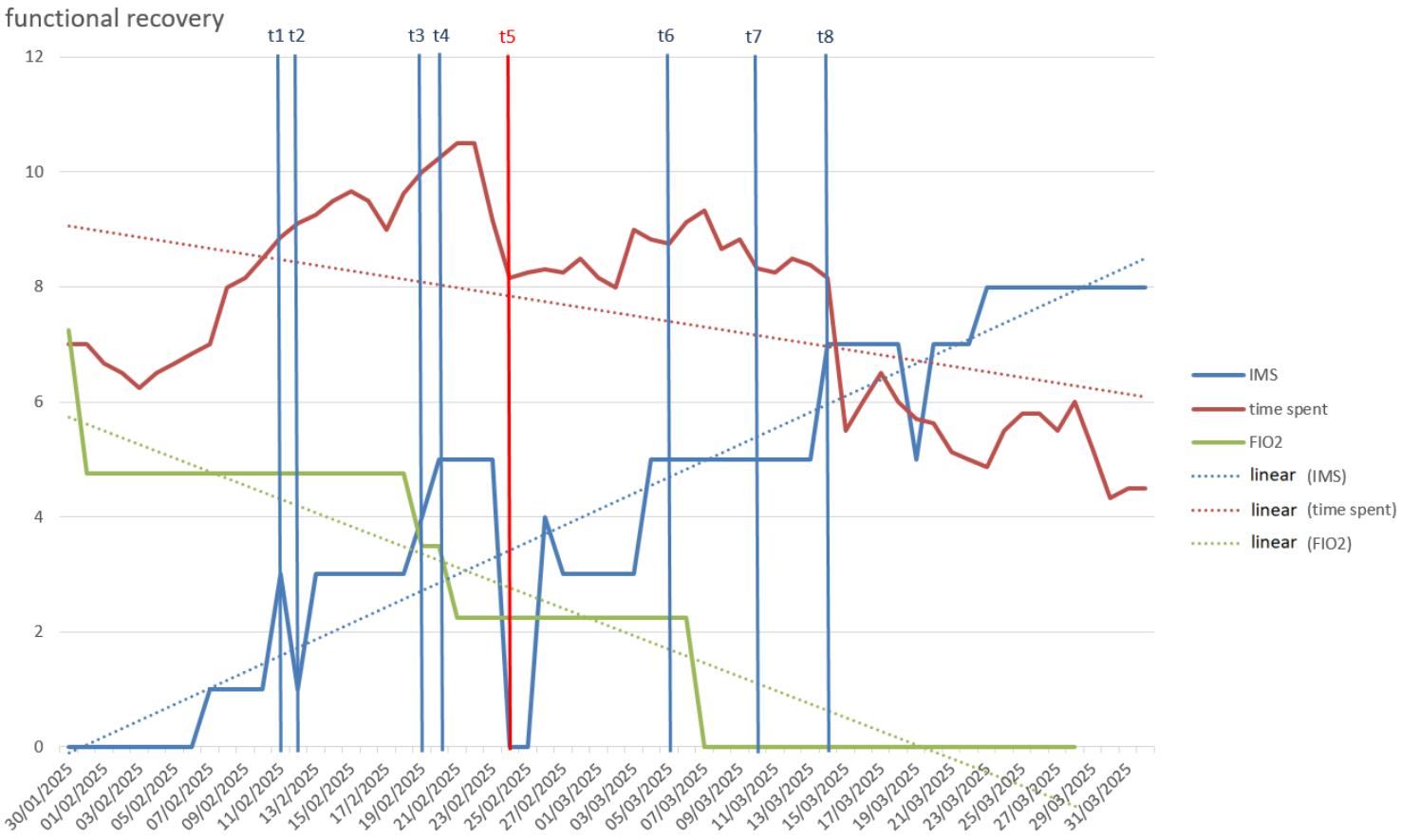


Figure 1

Timeline of rehabilitation interventions and clinical parameters. The x-axis shows intervention dates. The y-axis reports ICU Mobility Scale (IMS) scores, rehabilitation time (PT and RT), and reduction in FiO_2 (L/min). Dashed lines indicate temporal trends for IMS, intervention time, and FiO_2 over time. IMS ranges from 1 to 10. Intervention time is the mean daily duration over 5 days (2 days before and 2 days after) divided by 10. FiO_2 is the delivered oxygen flow rate (L/min), adjusted by subtracting the room-air oxygen equivalent and then dividing by 4 to match the scale of the other variables. Key clinical time points are indicated: t1 (11/02, first sitting at edge of bed), t2 (12/02, PEEP valve use for 6 h per shift), t3 (19/02, first standing), t4 (20/02, tracheostomy capping), t5 (24/02, clinical deterioration [sepsis]), t6 (05/03, swallow test passed), t7 (10/03, decannulation), t8 (14/03, first ambulation).