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Extubation outside the usual chair position: is it possible? Case report

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Abstract

Background
The withdrawal of ventilatory support is usually carried out in bed; sometimes patients can be extubated outside the usual position as in chair in special cases; benefiting early mobilization which is associated with reducing hospital stay and improving functionality.
Case Report
39-year-old female patient diagnosed with chronic kidney disease and requiring dialysis in the context of ventilatory failure due to emergency orotracheal intubation, after a favorable evolution, early mobilization was initiated and she was released from ventilatory support in a chair.
Conclusion
To date, out-of-bed extubation has not been associated with complications. In our case, it was successfully achieved by avoiding unnecessary bed rest and promoting proper posture.

Keywords Early mobilization; Mechanical ventilation; Intensive care; Weaning; Tracheal extubation.

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Introduction

The withdrawal of ventilatory support is typically based on the patient's characteristics and condition. [1] It is crucial for healthcare professionals to carry out this weaning process using individualized protocols, [2-3] as extubation failure ranges between 10% and 20%, [4] which is associated with prolonged hospital stays, increased days on mechanical ventilation, and higher mortality rates. [5]

This extubation process is usually performed in the semi-Fowler's position. [6] Ventilatory liberation outside the bed is uncommon in intensive care units (ICUs) and may be related to routine practices established by each unit, [7] a lack of early mobilization (EM) [8] protocols, and limited evidence. However, delaying EM in hemodynamically stable patients is unnecessary and could increase complications associated with prolonged immobility. [9]

Globally, literature on out-of-bed extubation is scarce. Therefore, the objective of this report is to share the experience of a successful case in an intensive care unit in Colombia, located in the Orinoquía region.

Case Description

A 39-year-old female patient, unemployed, with a medical history of chronic arterial hypertension, type 2 diabetes mellitus, and chronic kidney disease requiring dialysis, presented to a primary care hospital accompanied by a family member. She reported a four-day history of asthenia, adynamia, headache, and confusion. Upon evaluation, the patient was found to be somnolent with neurological deterioration, scoring 11/15 on the Glasgow Coma Scale. Due to her condition, she required orotracheal intubation and invasive mechanical ventilation.

Upon arrival at the emergency department via referral, the patient was under the effects of sedoanalgesia with midazolam and fentanyl, with a Richmond Agitation-Sedation Scale (RASS) score of -3. Her vital signs were as follows: heart rate of 90 beats per minute (BPM), oxygen saturation of 98%, respiratory rate of 20 respiration per minute (RPM), and blood pressure of 78/52 mmHg with vasopressor support. She was in septic shock of undetermined origin. Management was initiated with intravenous fluids and cefepime (2 grams every 12 hours intravenously). Initial laboratory results showed marked neutrophilia (94.8%), hypoglycemia (64 mg/dL), creatinine of 3.74 mg/dL, and a blood gas pH of 7.57. A cranial CT scan ruled out cerebrovascular events, while an ultrasound showed no evidence of a tubo-ovarian abscess. A chest X-ray revealed cardiomegaly.

Given the patient's critical condition, she was transferred to the intensive care unit (ICU) with a diagnosis of sepsis of pelvic and urinary origin, bacterial vaginosis, and bloodstream infection caused by beta-hemolytic Gram-positive cocci.

Following pharmacological treatment and dialysis therapy, by day 5, her laboratory values showed improvement: neutrophils at 74%, blood glucose at 131 mg/dL, creatinine at 0.8 mg/dL, and a blood gas pH of 7.43. Due to her favorable progress, a planned extubation was considered. Sedoanalgesia was discontinued, and the on-duty physiotherapist was responsible for conducting the weaning process and ventilatory liberation. The ventilatory mode was adjusted, and a spontaneous breathing trial (SBT) was initiated using a NEWPORT e360 ventilator following institutional protocol.

Thirty minutes later, the patient remained stable, followed simple commands such as opening and closing her hand without agitation, and tolerated SBT parameters successfully: pressure support of 4 cmH_2O, PEEP of 2 cmH_2O, and sensitivity of 0.8 cmH_2O. She exhibited an adequate breathing pattern, with vital signs within acceptable ranges. Both ventilatory and non-ventilatory predictors remained within safe parameters (Table 1).

Table 1: Ventilatory and Non-Ventilatory Predictors

Ventilatory predictors	
Index of rapid shallow breathing	36 R/L/Min
Peak expiratory flow rate	52 L/Min
Leak test	136 ml
Non-ventilatory predictors	
Glasgow	14/15
PaO_2/FiO_2	356

R: Respiration, L: Liter, Min: Minute, ml: Milliliter, mmHg: millimeters of mercury, PaO_2: Pressure arterial oxygen, FiO_2: Fraction of inspired oxygen

At the time of extubation, the patient was out of bed in a seated position. Given her overall stability (Figure 1), the case was discussed with the intensive care team (physiotherapist, physician, and nurse), who collectively decided to proceed with extubation in this position

(Figure 2). The patient's post-extubation course was favorable; she did not require mechanical ventilation again and was transferred to the general hospitalization unit on the thirteenth day.

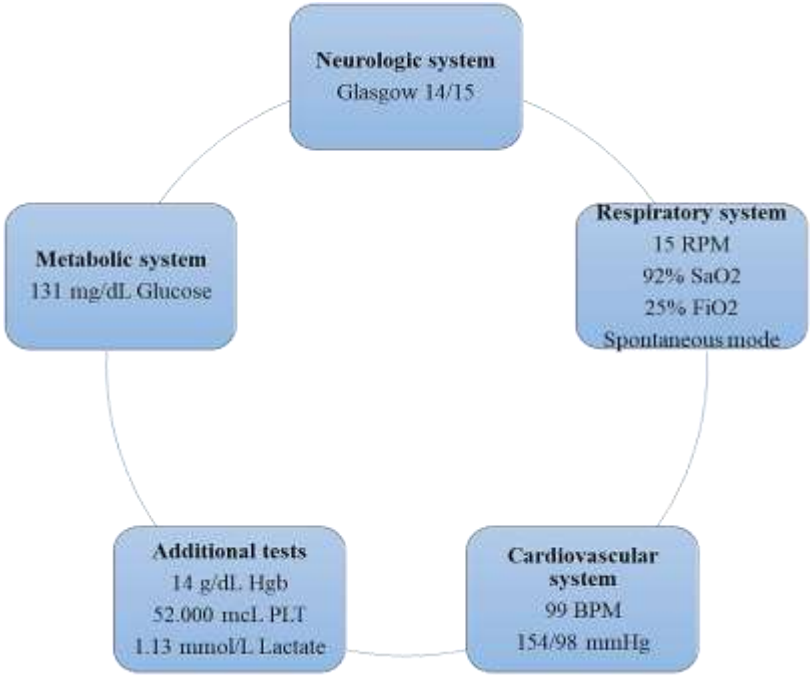

Figure 1: Safety considerations for early mobilization of the patient. Hgb: hemoglobin, PLT: platelets, mmol/L: millimoles per liter, BPM: beats per minute, mmHg: millimeters of mercury, RPM: Respiration per minute, SaO_2: Oxygen saturation; FiO_2: fraction of inspired oxygen, %: percentage, mg/dL: milligrams per deciliter.

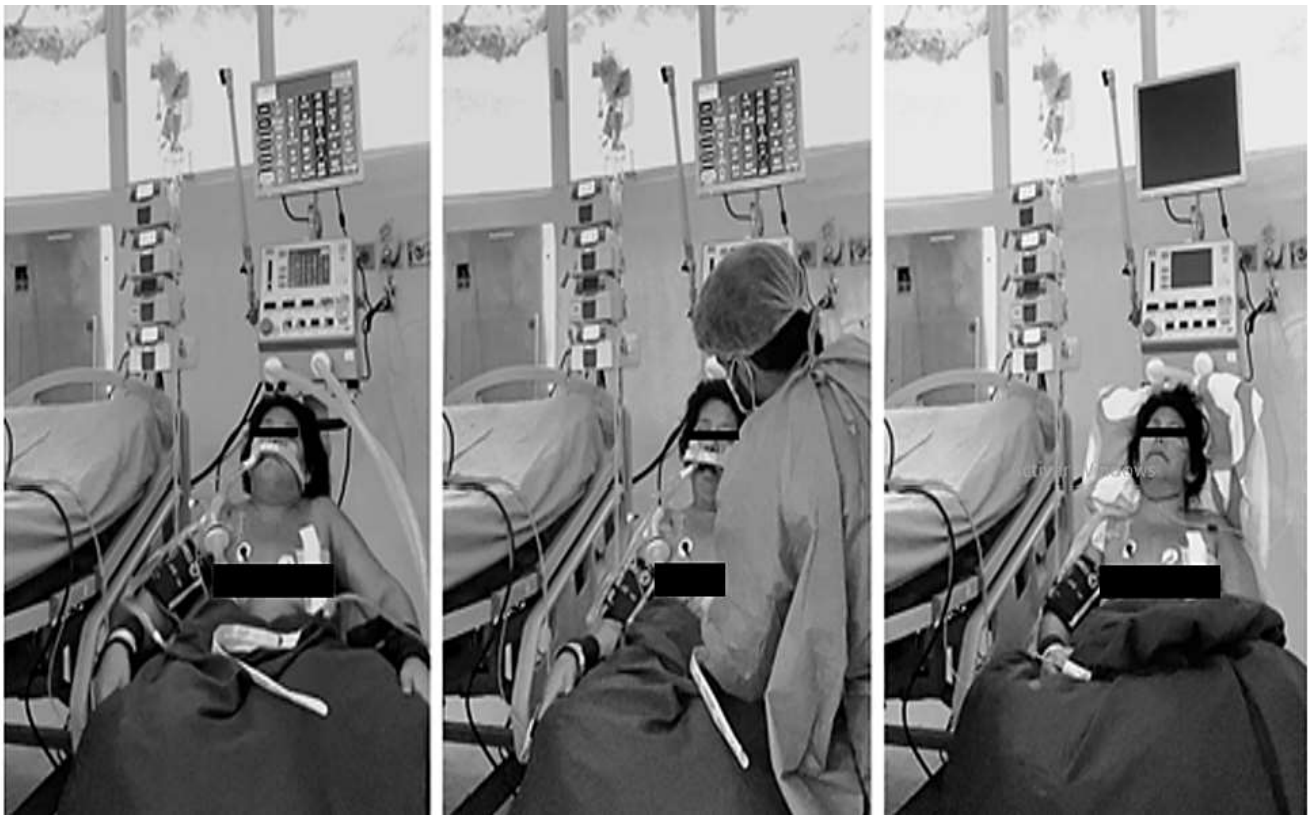

Figure 2: Patient during out-of-bed extubation

During her ICU stay, the patient received routine care from the physiotherapy team (Table 2), who were also responsible for identifying and implementing EM in patients meeting safety criteria.

Table 2: Physiotherapy Assessment and Interventions.

Physiotherapy follow-up during the stay					
Days	**1 Admission**	**4**	**5 Extubation**	**9**	**13 Discharged**
RASS/Glasgow	-3	-1	14/15	14/15	15/15
Ventilatory mode	Volume Controlled Mode	Spontaneous (Pressure Support Mode)	Spontaneous/Withdrawal of ventilatory support	No ventilatory support	No ventilatory support
IMS	0/10	1/10	3/10	6/10	8/10
MRC	NE	< 48	< 48	> 48	> 48
Edema	3/4 Ul & Ll	2/4 Ul & Ll	2/4 Ul & Ll	2/4 Ul & Ll	No edema
Interventions	Passive	Assisted	Assisted	Active	Resisted

RASS: Richmond Agitation and Sedation Scale; IMS: ICU Mobility Scale; MRC: Medical Research Council; A/C: Assisted controlled; NE: Not evaluable, Ul: Upper limbs; Ll: Lower limbs. <: Minor; >: Major

Discussion

This case report represents the first documented instance describing the key aspects of a patient who was successfully liberated from ventilatory support in a seated position out of bed.

To implement this practice, it is recommended to begin with a thorough assessment, including safety considerations [10] and laboratory findings, [11] followed by an evaluation of extubation failure risk based on predictive indicators. [12] Additionally, the patient's clinical condition and current status should be carefully considered. In this case, the patient met the necessary criteria, as her condition and laboratory values indicated a low risk.

Regarding out-of-bed extubation, current evidence is very limited. The only study demonstrating minimal complications associated with this procedure is the research by Dexheimer et al. [13] which reported that extubation in a seated position was not linked to adverse events and allowed extubation to occur simultaneously with EM. The findings in our case are consistent with these results, as the patient did not experience any complications.

Although this practice has not yet been standardized, it could offer multiple benefits, including reducing muscle mass loss, [14] preventing atelectasis, [15] and improving patient comfort and secretion management related to positioning. [16-17] Brahmbhatt N et al. [18] also suggest that EM is associated with enhanced functional recovery. Similar to our case, the patient achieved a sufficient level of recovery for activities of daily living.

Conclusion

Out-of-bed extubation can be successfully performed. This case report shares our experience of conducting this procedure in a patient who met the necessary conditions. This approach could facilitate the early initiation of mobilization, as mobilization is often started only after extubation. Currently, there are no established guidelines recommending its routine implementation; however, it can be considered in selected individualized cases.

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