



## CASE REPORT

# Acute Respiratory Distress Syndrome in a Morbidly Obese Patient : A Case Report

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**ABSTRACT**

Morbid obesity is an increasingly pressing challenge for emergency departments, owing to structural and technical limitations that compromise the delivery of appropriate care. A 48-year-old man with morbid obesity (body mass index [BMI] = 49 kg/m<sup>2</sup>) was admitted for acute respiratory distress secondary to severe pneumonia. Care was hampered by inadequate equipment, difficult venous access, and the inability to perform essential diagnostic investigations. Orotracheal intubation proved anatomically challenging. Despite transfer to the intensive care unit and prompt initiation of treatment, the patient died within 48 hours. This case underscores the urgent need for adapted hospital infrastructure, specific clinical protocols, and targeted staff training to ensure adequate care for patients with morbid obesity.

**Keywords:** Morbid obesity, Emergency care, Acute respiratory distress, Airway management, Resource-limited settings, Case report.

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## 1. INTRODUCTION

Morbid obesity, defined as a body mass index (BMI)  $\geq 40$  kg/m<sup>2</sup>, represents a major and rapidly growing global public health challenge. In 2022, more than 890 million adults worldwide were classified as obese (BMI  $\geq 30$  kg/m<sup>2</sup>), accounting for approximately 16% of the adult population, with prevalence having more than doubled since 1990 [1]. In France, recent epidemiological data estimate adult obesity prevalence at approximately 18.1%, corresponding to nearly 10 million individuals, while overweight and obesity combined affect almost half of the adult population [2]. In Algeria, World Health Organization age-standardized estimates indicate adult obesity prevalence ranging between 21% and 24%, with a continuous upward trend over recent decades [3]. Among children, recent local studies report concerning rates of overweight and obesity ranging from 13% to 23% in 5–12-year-olds; a survey in the Algiers region (INSP, December 2024) reported 13.4% obesity among 5–11-year-old schoolchildren [4,5].

Morbid obesity is associated with increased cardiovascular, metabolic, and respiratory morbidity, leading to poorer outcomes in acute care settings [2]. From a respiratory standpoint, obesity induces significant alterations in pulmonary physiology, including reduced functional residual capacity, impaired alveolar ventilation, and decreased chest wall compliance [6,7]. These changes predispose patients to chronic hypoxemia and hypercapnia and are frequently compounded by obesity hypoventilation syndrome and sleep-disordered breathing, particularly obstructive sleep apnea syndrome [8]. As a result, morbidly obese patients are especially vulnerable to acute respiratory decompensation during infectious episodes such as pneumonia, which may rapidly progress to acute respiratory failure [9].

Despite extensive literature addressing perioperative and intensive care management of obese patients, data focusing on emergency department care remain limited [9]. Emergency settings often constitute the first point of contact during acute decompensation and are characterized by unplanned presentations, high patient flow, technical challenges related to body habitus, and frequent inadequacy of adapted equipment and trained personnel [9,10].

Through the presentation of a case of acute respiratory distress in a morbidly obese patient, this report aims to highlight the practical obstacles encountered in emergency and intensive care settings, and to emphasize the need for adapted strategies to improve quality of care and equity for this growing patient population.

## 2. CASE REPORT

A 48-year-old man with a history of poorly controlled hypertension and type 2 diabetes mellitus was admitted to the emergency department for acute respiratory distress secondary to severe community-acquired pneumonia. He had morbid obesity, with a body mass index (BMI) of 49 kg/m<sup>2</sup>.

On admission, the patient exhibited marked respiratory distress. His heart rate was 110 beats per minute, respiratory rate 30 breaths per minute, and oxygen saturation (SpO<sub>2</sub>) was 82% on room air. Blood pressure measurement was not feasible due to the absence of an appropriately sized cuff. Clinical examination was significantly limited by the patient's body habitus. Pulmonary auscultation was technically difficult because of positioning constraints and excessive adipose tissue; however, bilateral decreased breath sounds associated with diffuse crackles, predominantly at the lung bases, were noted.

Peripheral venous access was difficult and required multiple attempts because of thick subcutaneous tissue. Arterial blood gas analysis could not be performed in the emergency department owing to technical limitations related to the absence of appropriate arterial access equipment. Initial laboratory investigations revealed a marked inflammatory response, with leukocytosis of 28,000/mm<sup>3</sup> and elevated C-reactive protein (CRP) levels (300 mg/L). Acute kidney injury was present, with serum creatinine of 50 mg/L and urea of 2.5 g/L. Blood cultures were obtained at admission, but microbiological results were not available before clinical deterioration. The CURB-65 score calculated at admission was 3 (confusion, respiratory rate ≥30 breaths per minute, and elevated urea), indicating severe community-acquired pneumonia. Empirical antibiotic therapy combining a third-generation cephalosporin and a macrolide was initiated, along with high-flow oxygen therapy (table 1).

**Table 1.** Laboratory findings at admission.

Parameter	Value
Leukocytes (/mm <sup>3</sup> )	28,000
C-reactive protein (mg/L)	300
Creatinine (mg/L)	50
Urea (g/L)	2.5
CURB-65 score	3

Because of worsening respiratory distress, the patient was transferred to the intensive care unit. This transfer required increased human and logistical resources. In the absence of a dedicated care pathway for morbidly obese patients, positioning and mobilization relied on improvised adaptations by a non-specialized team.

After ICU admission, bedside chest radiography was performed; however, image quality was severely impaired due to morbid obesity and the use of non-adapted imaging equipment, preventing reliable interpretation. Arterial blood gas analysis remained unobtainable because of persistent technical difficulties. Due to progressive respiratory failure, orotracheal intubation became necessary. Airway management was technically challenging because of obesity-related anatomical features and required multiple attempts. Despite invasive mechanical ventilation with high inspired oxygen (FiO<sub>2</sub> 80–100%), oxygen saturation remained critically low, reflecting severe hypoxemic respiratory failure (table 2).

After 24 hours of hospitalization, the patient developed hemodynamic instability with recurrent hypotensive episodes and cardiac rhythm disturbances. Despite optimized intensive care management, his clinical condition rapidly deteriorated, culminating in cardiac arrest and death 48 hours after admission.

**Table 2.** Evolution of SpO<sub>2</sub> and FiO<sub>2</sub> during ICU stay.

Hour post-admission	1h	4h	8h	12h	16h	20h	24h	28h	32h	36h	40h
SpO <sub>2</sub> (%)	80	80	81	82	83	84	80	82	83	84	80
FiO <sub>2</sub> (%)	80	85	90	95	100	100	100	100	95	90	85

### 3. DISCUSSION

The management of morbidly obese patients in emergency and critical care settings represents a major and growing challenge, resulting from the complex interplay of anatomical, physiological, technical, and organizational factors. While elective anesthesia pathways for obese patients are increasingly standardized, allowing anticipatory planning, appropriate equipment, and advanced airway strategies, emergency departments often remain insufficiently prepared to manage acute decompensation in this population [11-13]. The rising prevalence of morbid obesity worldwide makes such scenarios increasingly frequent and exposes structural gaps in emergency and intensive care systems.

In the present case, extreme obesity significantly limited the initial clinical assessment and monitoring. Physical examination was technically difficult, blood pressure could not be measured due to the absence of an appropriately sized cuff, and peripheral venous access required multiple attempts. These challenges are well described in the literature and are known to delay diagnosis and treatment initiation in obese patients presenting to emergency departments [6–8,10]. Such delays may be particularly detrimental in time-sensitive conditions such as severe pneumonia and acute respiratory failure.

A major limitation in this case was the inability to perform arterial blood gas (ABG) analysis. Thick subcutaneous tissue, difficult arterial access, and lack of adapted equipment prevented reliable sampling. Similar difficulties have been reported in morbidly obese patients and are recognized as a significant obstacle to accurate assessment in emergency settings [9]. In the absence of ABG data, clinical evaluation and continuous pulse oximetry became the primary tools for assessing respiratory severity. In our patient, persistent hypoxemia with SpO<sub>2</sub> values ranging from 80% to 84% over several hours, despite high FiO<sub>2</sub>, reflected severe gas exchange impairment and guided escalation of respiratory support.

Imaging assessment was also compromised. Bedside chest radiography was attempted but was non-diagnostic due to the use of a radiographic cassette not adapted to the patient's body habitus. Such imaging limitations have been reported in obese patients and may delay confirmation of pneumonia or detection of complications such as atelectasis or acute respiratory distress syndrome [10]. Together, the absence of reliable imaging and ABG analysis illustrates how technical constraints inherent to extreme obesity can hinder standard diagnostic pathways in emergency and ICU settings.

Despite these limitations, laboratory investigations revealed clear markers of disease severity. Marked systemic inflammation, with severe leukocytosis and elevated C-reactive protein, combined with acute kidney injury, supported the diagnosis of severe community-acquired pneumonia. The CURB-65 score of 3 indicated a high risk of mortality, emphasizing the need for early aggressive management. Previous studies have shown that morbid obesity is associated with increased severity of infectious diseases, higher rates of respiratory failure, and increased incidence of organ dysfunction, including acute kidney injury [9].

Airway management represented another critical challenge. Orotracheal intubation was technically difficult and required multiple attempts, reflecting obesity-related anatomical features such as reduced neck mobility, excess soft tissue, and limited visualization of airway landmarks. The literature consistently reports a higher incidence of difficult intubation and airway-related complications in obese patients, particularly in emergency situations where advanced airway devices and experienced operators may not be readily available [11–13]. Predictive airway scores and anticipatory strategies are recommended but are often difficult to implement in urgent, unplanned scenarios. In our patient, intubation was followed by persistent severe hypoxemia despite FiO<sub>2</sub> of 100%, consistent with the reduced functional residual capacity, impaired chest wall compliance, and limited respiratory reserve characteristic of morbid obesity [12,13].

Transfer to the intensive care unit further exposed organizational vulnerabilities. In the absence of a dedicated care pathway for morbidly obese patients, positioning and mobilization relied on improvised adaptations by a non-specialized team and required increased staffing and vigilance. This contrasts with published recommendations advocating specialized equipment, trained personnel, and structured ICU pathways to ensure safety and reduce complications in obese patients [10]. Such discrepancies between recommended standards and real-world practice highlight how organizational limitations can amplify clinical risk.

Ultimately, despite intensive supportive care, the patient deteriorated rapidly and died 48 hours after admission. This unfavorable outcome illustrates the multifactorial vulnerability of morbidly obese patients in emergency and critical care settings, where physiological fragility intersects with technical and organizational constraints.

#### 4. CONCLUSION

The management of morbidly obese patients in emergency settings is inherently complex and multidimensional. Morphology-related technical difficulties, lack of specialized equipment, insufficient staff training, and the absence of standardized protocols all contribute to increased morbidity and mortality. To enhance the quality of care, it is essential to implement dedicated care pathways for morbidly obese patients in emergency departments, acquire and maintain specialized equipment adapted for morbidly obese patients and develop standardized protocols to guide their use, and train medical and paramedical personnel to address the specific needs of this population. Only a comprehensive, coordinated, and anticipatory approach can improve outcomes and ensure patient safety in emergency settings for morbidly obese individuals.

**Informed Consent:** Informed consent from the patient could not be obtained due to his death. This case report is presented for scientific and educational purposes, with strict respect for patient anonymity, in accordance with ethical guidelines.

**Patient Anonymity:** The author declares that the patient's anonymity has been strictly maintained. No information that could directly or indirectly identify the patient is reported in this article.

**Conflicts of Interest:** The author declares no conflicts of interest related to this article.

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