

From Dyspnea to Skin Grafting: The Difficulties of Managing a Patient with Extreme Obesity

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Keywords

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Abstract

While the prevalence of severe obesity is increasing worldwide, caregivers are often challenged with the management of patients with extreme weight. A 30-year-old woman (weight 245 kg, body mass index 85 kg/m²) presented with dyspnea, for which investigations led to suspect pulmonary embolism. The patient's weight made it impossible to perform adapted imaging; thus, an empirical anticoagulant treatment was initiated. A hematoma of the thigh occurred as a consequence of a transient antivitamin K overdose, leading to a 15-cm necrotic wound worsened by a state of malnutrition. Multidisciplinary and comprehensive care was performed including wound trimming, antibiotics, skin grafting, treatment of malnutrition, and psychological support, but with marked difficulties due to the lack of adapted medical equipment and facilities as well as appropriate medical guidelines. Overall, 7 months of hospitalization including 4 months of physiotherapy and rehabilitation were needed before the patient could return home. This case

highlights how difficult managing patients with extreme obesity can be and points to the importance for healthcare systems to adapt to the specific needs of these patients and to design specific guidelines for treatment dosage and malnutrition prevention and treatment in this setting.

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Introduction

The prevalence of severe obesity has markedly increased in recent years [1, 2]. As a result, the number of patients with extreme obesity requiring specialized hospital care for various medical problems is growing. Caregivers from all medical specialties are more and more exposed to the specific difficulties in managing such patients. In this clinical setting, numerous physical, pharmacological, psychosocial, and human barriers can lead to inappropriate care of patients with extreme obesity, thus altering the prognosis and the possibilities of recovery [3]. We describe here the case of a young woman with extreme obesity who presented with a common symptom, dyspnea, and who suffered from a cascade of medi-



Fig. 1. Inner side patient's right thigh. **a** Wound upon arrival in the nutrition department: fibrinous edges and necrotic central zone. **b** Intermediate state after wound trimming, during VAC therapy: diameter of the wound was reduced and substance is regained. **c** After the skin graft: healthy edges and good epidermalization. VAC, vacuum-assisted closure system.

cal complications during treatment, explained in part by the scarcity of adapted infrastructures and appropriate medical recommendations in such patients.

Case Report

A 30-year-old patient, with extreme obesity (weight 245 kg, body mass index 85 kg/m²) presented herself to the emergency room of a university hospital in the Paris region, with acute dyspnea resistant to antibiotics and steroids. Initial investigations revealed tachycardia at 100 bpm, elevated D-dimers (2,810 ng/mL, normal <500 ng/mL), a pulmonary shunt on blood gas analysis (pO₂ = 9.6 kPa, pCO₂ = 3.9 kPa), a negative RT-PCR test for COVID-19, and normal chest radiography, leading to suspicion of pulmonary embolism. However, thoracic-CT angiography, which would provide confirmation of this diagnosis, could not be performed due to the patient's corpulence.

The diagnosis probability for pulmonary embolism was estimated to be strong enough to empirically start anticoagulation

with heparin at dose of 50,000 IU/24 h (i.e., 204 IU/kg/24 h vs. 430 IU/kg/24 h for standard posology, using adjusted body weight), followed by Coumadin (antivitamin K; VKA), introduced at 10 mg daily (i.e., twice the dose prescribed in patients with normal weight). During inpatient monitoring, a transient VKA overdose was observed (international normalized ratio 5.5), leading to a reduction of the dose to 5 mg daily.

Ten days later, the patient presented with pain on the inner face of the right thigh, with fever and a marked biological inflammatory syndrome (C-reactive protein at 275 mg/mL). Again, a CT scan of the limb was not feasible due to the patient's weight. Alternatively, an ultrasound examination was performed, showing soft tissue infiltration without collection, suggesting a superinfection of a hematoma, likely due to transient VKA overdose combined with local skin friction. Metabolic tests did not reveal any impairment in glucose tolerance. A broad-spectrum antibiotic therapy, with tazocillin and linezolid, was started and pursued for a duration of 3 weeks. While local evolution was initially favorable, the wound subsequently deteriorated with the appearance of phlyctenes and epidermal detachment, followed by central necrosis and 15 cm in diameter-circumferential loss of substance (Fig. 1a). Sur-

gical management was required, but the patient was turned away from several surgical departments, due to her extreme weight. Throughout this period, the patient was kept in bed with insufficient energy intake (1,500–1,800 kcal/d), leading to a weight loss of 18 kg in 2 months (i.e., 7.3% of her initial weight), loss of muscle function, and decreased albumin level at 29 g/L, defining moderate malnutrition according to GLIM criteria [4].

The patient was then transferred to our clinical nutrition department for further management. A pulmonary CT angiography could be arranged in the only hospital in the region with appropriate radiology equipment, that showed no evidence of pulmonary embolism, allowing the anticoagulants to be stopped after 7 weeks of empirical treatment. CT scan of the right thigh revealed cellulitis without abscess. A joint management with the orthopedic team was set up for washing, trimming, and healing of the wound, assisted by a vacuum-assisted closure system along with antibiotic treatment. Due to logistic difficulties for patient's transport (specific bariatric stretchers and double team required), the access to the operating room was regularly denied at the last moment, delaying her treatment for several days. After 1 month of local care and vacuum-assisted closure system treatment (Fig. 1b), an autologous skin graft, taken from the contralateral thigh, was performed by the plastic surgery team. The local evolution was favorable with good graft adhesion (Fig. 1c). The patient had severe sleep apnea syndrome treated with continuous positive air pressure (CPAP) but was almost never wearing the device since several years. Improving her compliance to CPAP was a major objective to promote tissue oxygenation and optimize healing capabilities. Her CPAP wearing time increased from 0 to an average of 4 h per day.

Upon arrival, we estimated her energy requirements in the context of a skin infection to be 2,860 kcal/d (see justification below). The patient's diet was increased with enriched meals and addition of snacks, reaching a total energy intake of 2,800 kcal/d. After 6 weeks, she had regained 4 kg, and her albumin levels were partially corrected (31 g/L).

Before being hospitalized, the patient was completely autonomous in her daily life. After 3 months of confinement to bed, one consequence was a major loss of autonomy. The possibility of sarcopenic obesity was considered as the patient had the two criteria necessary for screening. Her handgrip test was normal, but she could no longer walk more than a few steps, and she suffered from marked physical deconditioning. However, body composition could not be performed during hospitalization, so the diagnosis couldn't be confirmed [5]. After a long delay, she was finally transferred to one of the very few post-acute rehabilitation units able to take care of patients with such severe obesity. Motor rehabilitation lasted for a period of 4 months before she was able to return home, 7 months after initial hospitalization. Throughout her hospitalization, the patient often suffered from stigma related to her weight, significantly altering her self-esteem and increasing anxiety about her future, and psychological support was needed.

Discussion

This case highlights how difficult managing patients with extreme obesity can be. First, accessibility to adapted healthcare and medical equipment is very limited. Perform-

ing examinations such as pulmonary CT scan to confirm or rule out the presence of pulmonary embolism is often impossible due to the weight limit of the radiology tables, leading to prolonged empirical anticoagulant treatment [6]. Transport requires greater human and technical assistance. Furthermore, the scarcity of post-acute rehabilitation units with sufficient expertise and equipment to manage these patients can lead to longer admission times and delay recovery. Overall, this lack of adapted equipment and structures often leads to suboptimal care and, sometimes, serious complications, as illustrated by this case [7].

Second, the choice of drug type and dosage in patients with extreme obesity remains difficult due to lack of guidelines in this field. Heparin and antibiotics dosage was here calculated using adjusted body weight equations (which probably prevented an even greater anticoagulant overdose), but there is no clear guidelines supporting this choice [8]. Because of the lack of proof of efficacy of direct oral anticoagulants in patients with extreme obesity [9], the patient was treated with VKA. However, recent studies show that direct oral anticoagulants may have similar efficacy and safety to VKA, even at standard doses [10], but there are no clear guidelines to decide which anticoagulant treatment to start in the case of extreme obesity.

Third, this case points to the importance of preventing and managing malnutrition in patients with severe obesity to limit potential deleterious effects on wound healing process. General recommendations call for an energy intake of 30–35 kcal/kg/d in an infectious context [11]. However, this would translate in >7,000 kcal/d for our patient. Some experts suggest using Harris and Benedict formula [12] on adjusted body weight [13] to estimate energy intake requirements for hospitalized patients with severe obesity. Ideal body weight in her case would be 60 kg using Lorentz formula. Adjusted body weight was estimated at 152 kg using a 0.5 correction factor. We used a 0.5 correction factor (and not 0.25) to avoid underfeeding in this context of malnutrition and infected wound. Basal metabolic rate estimated with the Harris and Benedict formula using this adjusted weight was 2,288 kcal/day and was multiplied by a 1.25 stress factor in the context of infection which led here to a total estimated daily energy requirement of 2,860 kcal/d. However, there is no consensus on using these equations and formulas and proper guidelines are needed to help clinicians achieve appropriate nutritional goals in cases of severe obesity.

Fourth, obesity, and moreover extreme obesity, remains a major cause of stigma, mainly related to misconceptions and prejudices about people that are overweight [14, 15]. It is also a negative factor for caregivers, against

which control and prevention strategies are difficult to implement. Due to a lot of past negative medical experiences, the patient was very cautious. Gaining her adherence to the care required a lot of patience and empathy.

Finally, this case also underlines the importance of considering obesity as a complex disease for which BMI is insufficient to properly classify the severity. There is a need for further investigations based on the concept of differently diagnosed obesity to better establish the real burden of the different obesity phenotypes [16].

Statement of Ethics

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. Ethical approval is not required for this study in accordance with local guidelines.

Conflict of Interest Statement

The authors declare that they have no conflict of interest.

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Author Contributions

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Data Availability Statement

All data generated or analyzed during this study are included in this article. Further inquiries can be directed to the corresponding author.