

ANALYSIS OF PULMONARY FUNCTION IN PATIENTS WITH SEVERE OBESITY INDICATED FOR BARIATRIC SURGERY: A LITERATURE REVIEW

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ABSTRACT

Introduction: Obesity is a chronic disease characterized by excessive accumulation of body fat, which causes significant harm to the individual. This condition has reached epidemic proportions, becoming a global health problem with increasing prevalence in recent years, and is the most frequent metabolic disorder. The surgical procedure most commonly used for the treatment of morbid obesity is bariatric surgery, with variations depending on the techniques employed.

Objective: To identify the correlation between obesity and its effects on pulmonary function, ventilatory pressure, and mechanics, with a focus on the influence of bariatric surgery on patients' functional recovery. **Methodology:** Articles were collected from databases such as PubMed, Google Scholar, and SciELO, published between 2010 and 2024, using Health Sciences Descriptors (DeCS): "severe obesity," "bariatric surgery," and "pulmonary function." Inclusion criteria were clinical trials, published in any language and with free access, that addressed the topic. Exclusion criteria included incomplete studies and those with missing data. **Results:** Correlations were observed between obesity and worsening pulmonary function in obese patients, with reductions in vital capacity (VC) and functional residual capacity (FRC), as well as improvements in parameters such as forced expiratory volume in the first second (FEV1) and forced vital capacity (FVC) after bariatric surgery and subsequent weight loss. **Conclusion:** The analyzed studies demonstrate a negative relationship between obesity and pulmonary function, particularly in morbidly obese patients indicated for surgery, where significant ventilatory impairment is present.

Keywords: Severe obesity; Bariatric surgery; Pulmonary function.

INTRODUCTION

Obesity is a chronic disease characterized by the excessive accumulation of body fat, which causes significant harm to the individual. According to the

World Health Organization, obesity has reached epidemic proportions, affecting people of all ages and social classes worldwide. Excess weight promotes metabolic and structural changes, making individuals with obesity more susceptible to several diseases (MELO; SILVA; CALLES, 2014).

It is a global health problem of great magnitude, with growing prevalence in recent years, and is the most frequent metabolic disorder worldwide. Its etiology is complex and multifactorial, resulting from the interaction of genetic, environmental, lifestyle, and emotional factors, with the modern environment being a strong stimulus for obesity (MAFORT, 2018).

The surgical procedure used to treat morbid obesity employs two main techniques in bariatric surgery, known as malabsorptive and restrictive procedures (TENÓRIO; LIMA; SANTOS, 2010). In recent years, the repercussions of adiposity on respiratory function have been studied. In individuals with obesity, structural changes in the thoracoabdominal region lead to limitations in diaphragmatic mobility and rib movement, both essential for adequate ventilatory mechanics (MELO; SILVA; CALLES, 2014).

Excess adipose tissue causes mechanical compression of the diaphragm, lungs, and thoracic cage, resulting in restrictive pulmonary insufficiency. In addition to surgical procedures for obese patients, respiratory physiotherapy is recommended, as it is essential for the recovery of pulmonary function and the prevention of respiratory complications such as infections, atelectasis, and others. Respiratory complications such as dyspnea on minimal exertion, changes in respiratory mechanics, and sleep apnea may also occur (TENÓRIO; LIMA; SANTOS, 2010; SCIPIONI et al., 2011).

In this context, the present study aimed to identify the correlation between obesity and its effects on pulmonary function, ventilatory pressure, and mechanics, with a focus on the influence of bariatric surgery on patients' functional recovery.

METHODOLOGY

This study is characterized as a literature review. The search for articles was conducted in PubMed, Google Scholar, and SciELO databases, in addition

to manual searches in the references of included studies. The search criteria established were studies published between 2010 and 2024, using Health Sciences Descriptors (DeCS): “severe obesity,” “bariatric surgery,” and “pulmonary function,” combined with the Boolean operator “AND.” Inclusion criteria were clinical trials published in any language, with free access, that addressed the topic; exclusion criteria were incomplete studies and those with missing data.

RESULTS

A total of four original articles were selected, which provided comprehensive and well-founded information on the subject. Correlations were found between obesity and worsening pulmonary function in obese patients, as well as improvement in pulmonary parameters following bariatric surgery and consequent weight loss.

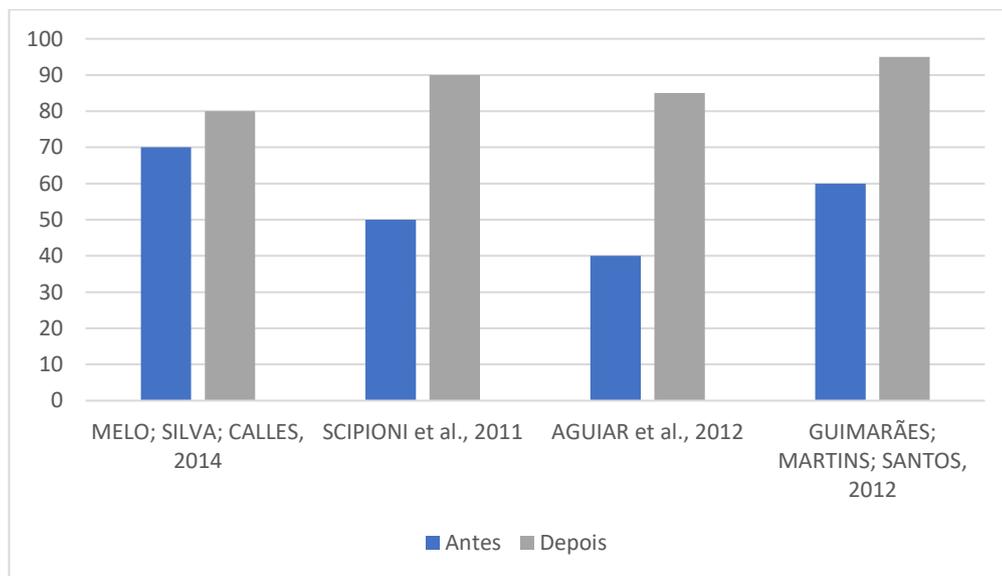
Obesity is associated with reductions in vital capacity (VC) and functional residual capacity (FRC), along with increased airway resistance and mechanical impairment such as reduced chest expandability. Central obesity exerts a greater impact on respiratory function due to increased pressure on the diaphragm, limiting ventilation (MELO; SILVA; CALLES, 2014).

Analysis of pulmonary function changes in morbidly obese patients after bariatric surgery demonstrates that significant weight loss following the procedure is associated with improved pulmonary function, particularly in parameters such as increased forced expiratory volume in the first second (FEV1) and forced vital capacity (FVC). This reflects partial reversal of ventilatory limitations caused by obesity, improving patients' quality of life (SCIPIONI et al., 2011).

Further studies reinforce that morbid obesity contributes to alveolar hypoventilation and aggravates respiratory conditions, with obstructive sleep apnea being a significant factor in pulmonary function deterioration in obese individuals. Improvement in breathing patterns and sleep has been observed after bariatric surgery, as weight loss relieves pressure on the upper airways (AGUIAR et al., 2012).

Another analysis revealed that the degree of obesity influenced alterations in lung volumes and capacities, particularly reductions in maximal expiratory volume (MEV), forced vital capacity (FVC), total lung capacity (TLC), and functional residual capacity (FRC) at the expense of expiratory reserve volume (ERV). Altered gas exchange was also observed, with increased PaCO₂ and decreased PaO₂, which can be attributed to hypoventilation and ventilation/perfusion mismatches (GUIMARÃES; MARTINS; SANTOS, 2012).

Figure 1. Impact of Bariatric Surgery on Pulmonary Function in Obese Individuals



Source: author

These findings demonstrate significant improvement in pulmonary function after bariatric surgery. Increased lung elasticity and reduced inflammatory parameters associated with obesity contribute to more efficient pulmonary recovery. The importance of evaluating pulmonary function before and after surgery is also emphasized, in order to quantify the reversal of respiratory impairment.

CONCLUSION

The findings indicate a negative relationship between obesity and pulmonary function, particularly in morbidly obese patients indicated for surgery, where significant ventilatory impairment is present. Moreover, bariatric surgery emerges as a crucial factor in reversing part of the respiratory damage associated

with obesity, contributing to improved pulmonary function, quality of life, and sleep quality in patients following weight loss.

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