



## Anesthesia in Obesity

Özgür Oğul Koca\* and Burcu Tanay Demirdöven

Business administration, University of Economics, İzmir, Turkey

Buca Seyfi Demirsoy Hospital Emergency Department, İzmir, Turkey

\*Corresponding author: Özgür Oğul Koca, Business administration, University of Economics, İzmir, Turkey

### Review Article

Ideal weight (kg) = Height (cm) -100 (Male)

Ideal weight (kg) = Height (cm) -105 (Female)

Obesity 20% from ideal weight ↑

In TURKEY 35% of total population obese, 6% morbidly obese 38.5% of women 26.4% of men are obese

Obese (BMI 30 - 34.9)

Severely Obese (BMI 35 -39.9)

Morbid Obese (BMI> 40)

Super Obese (BMI> 50)

Ultra Obese (BMI> 60)

Mega Obese (BMI> 70)

1. Obesity-related problems
2. Pulmonary embolism
3. DVT
4. Cancer
5. Stroke
6. Sleep Apnea Syndrome
7. Osteoarthritis
8. Type 2 DM
9. Hypertension
10. Coronary artery disease
11. Metabolic syndrome
12. Hypoventilation syndrome

13. Airway and respiratory system affected [1]

14. Reproductive problems

15. Liver and gall bladder diseases

Increased cardiac output and blood volume cause an increase in the workload of the heart. Arterial hypertension and left ventricular hypertrophy develop because the increase in cardiac output (0.1 L / min for every 1 kg of adipose tissue) is provided by the increase in stroke volume. It causes pulmonary vasoconstriction due to increased pulmonary blood flow and hypoxia, pulmonary hypertension and cor pulmonary.

Obesity-hypoventilation Syndrome (Pickwickian syndrome) is a complication of extreme obesity. It is characterized by hypercapnia, polycythemia due to hypoxia, right heart failure and sleepiness. These patients have weak respiratory stimulation and snoring and upper airway obstruction (obstructive sleep apnea syndrome) are observed during sleep. Obstructive sleep apnea syndrome causes an increase in perioperative complications: hypertension, hypoxia, dysrhythmia, MI, pulmonary edema, difficulty in airway patency during induction, airway obstruction during recovery. If opioids and sedatives are used and the supine position is given, the risk of postop airway obstruction is high. Therefore, CPAP application should be considered until full recovery is achieved [1,2].

### Factors Affecting Drug Distribution in Obesity

Increased cardiac output, increased blood volume, increased organ size and increased fat mass. Theoretically, excess fat deposits cause an increase in the distribution volume of fat-soluble drugs (benzodiazepines, opioids, thiopental, propofol). The increase in volume of distribution means that a higher loading dose is required for the same plasma concentration. However, the restricted blood flow of adipose tissue reduces the effects of increased adipose

tissue on acute distraction and elimination of the drug.<sup>^</sup>[3] The distribution volumes and elimination half-lives of lipophilic drugs increased in obese patients.

The response of the central nervous system to the induction dose of thiopental in obese patients is not different from that of non-obese patients, so the dose of the drug should be chosen according to the ideal body weight, not the actual weight of the patient.

### Summary

The dose of intravenous induction agents should be adjusted according to the needs of the patient, not by calculation of milligrams per kilogram. Since the clearance rate is expected to decrease due to the high volume of distribution, the frequency of maintenance drug administration should also be reduced. The distribution volume of the water-soluble drugs (neuromuscular blockers) did not change. However, to avoid drug overdose, water-soluble drugs should be given according to ideal body weight. The distribution of volatile anesthetics to adipose tissue is very slow. Volatile anesthetics can be stored in adipose tissue. However, prolongation of recovery is not expected from volatile anesthesia in obese patients due to the slow distribution to adipose tissue. Increased metabolism of volatile agents and hypoxia in obese patients explain the increased risk of halothane hepatitis in these cases [4]

a. Isoflurane and desflurane can be chosen in obese cases as they are the least metabolized volatile agents.

b. Caution should be exercised in using nitrous oxide in obese cases due to increased intrapulmonary shunts and oxygen requirement.

c. Care should be taken in the use of opioids due to the increased risk of postoperative hypoxemia and hypoventilation.

1. Story
2. Sleep apnea
3. Somnolence
4. HT, CHF, coronary artery diseases
5. GER, hiatal hernia
6. DM
7. Deep vein thrombosis
8. Physical examination

9. Respiratory system: Dyspnoea, orthopnea, cyanosis  
10. Airway should be evaluated; Sits and is in a supine position

1. The neck is short and thick
2. Temporomandibular and atlantooccipital joint movements are limited
3. The top airlines are narrow
4. The distance between the mandible and the sternal fat pads is short
5. Pharyngeal and palatal soft tissues are abundant
6. Larynx may be in anterior localization
7. Language is big

### Cardiovascular System

Hypertension, heart failure, angina It should be evaluated in terms of arterial and vein access. Large blood pressure cuff (cuff should cover 70% of the arm)

### Arterial Catheter Tests

ECG Ac radiography Detailed biochemistry (KC func, Lipid, blood sugar etc.)

### Blood Gases Respiratory Function Tests Position

20-30 Reverse Trendelenburg: Ideal Premedication: Gastric acidity (H2 antagonists, antacids) and gastric volume (metoclopramide) should be reduced Sedatives, hypnotics and opioids should be used with caution due to sleep apnea. Intubation [1,3]

Awake endotracheal intubation may be safe in patients with massive obesity, small mouth-short neck, sleep apnea, and patients with impaired pulmonary and cardiovascular function.

Fiberoptic intubation may be required. The ramp position can facilitate intubation. In obese patients, desaturation may develop rapidly during the apnea period during intubation, as lung volumes are decreased and oxygen consumption is increased. Therefore, the cases should be preoxygenated before induction and denitrogenation of the lungs should be provided. Induction agents should be short acting. Intubation should be confirmed with end-tidal carbon dioxide, as respiratory sounds may not be heard well.

Ventilation [1,2,3].

General anesthesia can worsen oxygenation by causing a decrease in functional residual capacity and impairment in the ventilation-perfusion relationship. Therefore, controlled

ventilation with 50% oxygen is frequently applied in these cases. In these cases, controlled ventilation with high tidal volume provides better oxygenation. Even with lithotomy, trendelenburg and controlled ventilation in the prone position, sufficient oxygenation may not be achieved and the oxygen concentration is increased in these cases. PEEP should be used with caution. Excessive levels of PEEP may further increase existing pulmonary hypertension.

### Regional Anesthesia

Due to the adipose tissue, the cue points are unclear so there may be a hassle. In obese cases, the dose of local anesthetic to be used for epidural and spinal anesthesia should be 20-25% less than normal individuals, since epidural adipose tissue is excessive and epidural veins are large. In the sitting position, the localization of the midline and the insertion of the spinal needle is easier. Postop respiratory complications are less in regional anesthesia.

Postop Prefer regional techniques for pain control.

Patient controlled analgesia may also be preferred. Be wary of respiratory depression. Make sure that the muscle relaxant effect is fully antagonized (perform neuromuscular monitoring if necessary) Monitor oxygenation with a pulse oximeter Position in a half-seated (45 degrees) recovery room (diaphragm load is reduced) The risk of hypoxia may continue for a few days postoperatively; Oxygen should be given routinely. Early ambulation should be provided There are risks of postop wound infection, deep vein thrombosis and pulmonary embolism.

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\*Corresponding author: Özgür Oğul Koca, Email: [ugur.koca@deu.edu.tr](mailto:ugur.koca@deu.edu.tr)

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