Anesthesia in Obesity

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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 pulmonale.

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.^[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
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.

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, antecides) 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.

**References**


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