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LAPROSCOPIC MINI GASRTRIC BYPASS SURGERY IN MORBID OBESE PATIENT: A CHALLENGE FOR ANESTHESIOLOGIST

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ABSTRACT

There has been an increase in prevalence of obesity over last few decades. Obesity is multifactorial disease associated with numerous co-morbidities and complications which is mainly classified based on individuals body mass index. This is a challenge for the anesthesiologist to manage the patient perioperatively because of various cardiovascular and respiratory complications that are associated with it. The compromised airway and change in respiratory physiology in obese patients and the intra-operative factors like positioning, choice of surgical methods like laparoscopy further poses a challenge in management of airway, ventilation, fluid management. The peri operative risk of deep vein thrombosis, myocardial infraction, early ambulation and discharge are other concerns that are to be addressed and managed effectively. Hence, it becomes essential for the anesthesiologist to be aware of techniques for effective management of morbid obese patients posted for laparoscopic surgery for better outcomes post operatively.

Keywords: Anesthesia, Laparoscopy, Obesity, Peri-operative, Surgery.

Introduction

Obesity has become a worldwide epidemic with a significant increase in its prevalence over last few decades. The increase in number of obese is greater in developing countries more than the developed countries. The National Health and Nutritional Examination Survey (NHANES) has reported the prevalence of obesity as, 40.4% and 35% amongst females and males respectively in USA in 2016. Where as in the European Union (EU) countries, about 40–50% males and 25–35% females were overweight and 15– 25% males and females were obese in 2008 [1,2]. There have been various measures taken to curb this global epidemic but with little success.

Numerous environmental, genetic and hormonal factors lead to obesity and hence its a multifactorial disease which doesn't prevail alone but is usually associated with enumerable comorbidities like: hypertension, type 2 diabetes mellitus and coronary artery diseases, dyslipidemia, obstructive sleep apnea (OSA), Gall stones, osteoarthritis and various psychological disorders. Obesity is one of the major risk factors for asthma. Higher prevalence of asthma is commonly seen in obese individuals as compared to non-obese ones. Because of the enumerable co-existing comorbidities and complications that accompany obesity, it becomes a challenge for anesthesiologist for managing these patients effectively in peri-operative period [3,4].

Most of the complications which are seen perioperatively in obese patients are because of associated co morbidities, difficult airway, compromised respiratory physiology, that is, decreased lung volumes, compromised lung and chest wall compliance and varying degrees of hypoxemia. Intraoperatively, difficulty in airway management and ventilation due to positioning on an already compromised, peripheral nerve injuries, fluid administration. Post-operatively, the risk for developing myocardial infarctions, wound infections, deep venous thrombosis (DVT) and nerve injuries are common.

Patients with morbid obesity have pulmonary functions which are significantly compromised. Due to pneumoperitoneum and the movement of intra-abdominal contents against the diaphragm, respiratory complications set in peri-operatively in patients undergoing laparoscopic surgery. lung volume reduction, atelectasis, decreased pulmonary and chest wall compliance, moderate to severe hypoxemia are anticipated. These adverse effects are mainly because of Trendelenburg position, pneumoperitoneum and pressure on the diaphragm. The following strategies have been applied to reduce the adverse effects on lung function in patients with obesity undergoing anesthesia and surgery under laparoscopy. Strategies like: application of PEEP, Lung recruitment maneuver by small airway opening with help of applying intermittent hyperinflation of the lung are ways which can be employed foe better outcomes [1].

Case

Our patient was a 38-year-old male, with complaints of increased body weight since adolescence, presented for evaluation for bariatric surgery. He had history habitual snoring (as observed by his wife), waking unrefreshed, morning headaches, excessive day time sleepiness, impaired concentration, fatigue and breathlessness on physical activity.(NYHA Grade = 3) (METS =3).On general examination, Patient was conscious, co-operative and well oriented, Heavy built (Weight = 150 kg, Height = 171 cm, BMI = 51 kg/m2).He was afebrile, pulse rate:94 bpm, Regular, Blood pressure:134/82, Respiratory rate: 20 breaths/min, SPO2 on room air-97-98% in supine position. No pallor, Icterus, Cyanosis, Clubbing, Lymphadenopathy, Oedema.

On airway examination, patient had: Double chin, heavy jaw, short neck, Mallam Pati class = III, No loose/missing teeth, Thyromental distance = 5.5 cm, Sternomental distance = 10 cms, Upper lip bite test = Grade 1, Neck circumference = 36 cm, Neck movements = limited (extension = 45-50 degrees, flexion = 15-20 degrees, No obvious swelling over the neck.

On systemic examination: He was conscious, co-operative and well oriented, S1S2 heart sounds heard normally, no murmurs, large breast, no chest wall abnormalities, no swellings, dilated veins, scars, sinuses, skin appeared normal, air entry bilaterally equal, no adventitious sounds. Per-abdomen: soft, non-tender, no guarding/rigidity, Waist circumference-110 cms.

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All routine blood investigations, chest XRAY, ECG, 2D ECHO were within normal limits. Patient was given fitness for general anesthesia under ASA III. Written and informed consent was taken, adequate blood was reserved, nil per oral status checked. Aspiration prophylaxis with a combination of IV Injection Ranitidine 50mg, Injection Metoclopramide 10mg and Injection Ondansetron 4 mg was given. Preoperatively patient was nebulized half an hour before surgery. Prophylactic antibiotic given after test dose. Anesthesia machine was checked and the emergency airway cart was prepared keeping in mind the difficult airway. All emergency drugs, working suction machine, video-laryngoscope trolley, difficult airway trolley was kept prepared.

Standard monitors like -Pulse oximeter, ECG, Noninvasive Blood pressure (extra-large sized cuff), End-tidal carbon dioxide, nasal temperature probe was attached. An 18G intravenous line was secured in addition to a 20G. An infusion of crystalloid solution was started at 4ml/kg body weight. Rapid airway management positioner *(*RAMP) position from scapula to the head was given. Patient was preoxygenated for 3 minutes with 100 percent oxygen with 5 number face masks in reverse Trendelenburg position. Injection glycopyrrolate 02 mg IV, injection fentanyl 150 mcg IV, injection Etomidate 21.5 mg IV was given. injection succinylcholine 120 mg IV was given after confirmation of adequate bag and mask ventilation. After 60 seconds, laryngoscopy was done with C -MAC laryngoscope blade 4, after visualizing vocal cords, 8.5 size cuffed endo tracheal tube was passed over the bougie and cuff was inflated. The intubation was confirmed with EtCO2. Loading dose injection Cisatracurium 10.5 mg IV was given. Injection paracetamol 1g Iv was given prior to surgical incision. The patient was put on volume control ventilation with tidal volume of 6ml/ kg IBW and respiratory rate was adjusted so as to maintain adequate minute ventilation and EtCO2 between 35 to 40 mmHg. The anesthesia was maintained on O2: air: 50:50 with low flows 1 liter per minute and inhalational agent used was desflurane 6%. External body warmer was kept in place. Padding of all pressure points was done. Eyes were taped, pneumatic stocking was applied to both lower limbs. Intraoperative vital were monitored. The surgery lasted for 2 hours duration after which, Injection Ondansetron 4 mg IV, Injection Dexamethasone 8mg was given. Adequate ETT and oral suctioning was done and reversal of muscle relaxant was done using Injection Neostigmine 3.5 mg + Injection Glycopyrrolate 0.5 mg after the patient was awake and after there was return of protective airway reflexes. No.7 naso-pharyngeal airway was kept in place and patient was put in reverse Trendelenburg position. Lung recruitment maneuver was done and patient was extubated uneventfully. Patient was conscious, obeying commands post extubating. The patient was then shifted to post operative recovery room for observation and was mobilized to the ward in the evening.

Figure 1: RAMP POSITION

Discussion

Anesthetic Considerations and challenges in this case were Difficult IV access, Inadequate size of the OT table, heavy jaw and difficult mask holding with large size mask, Large and heavy breasts with short, wide neck with restricted head extension due to excessive fat pad in cervical region, high Mallampatti grade.

All of these contributed to difficult laryngoscopy and intubation. Hence, elevation of patient's upper body, head and neck above the level of chest until the external auditory meatus is in the same horizontal plane as the sternal notch. This ramp-up position helps in improving the intubation outcomes [5]. These patients have tendency to desaturate more faster during apnoea because of the compromised respiratory physiology. It therefore becomes necessary to take appropriate steps to prevent or reduce such chances of desaturation during induction. Following measures can be taken: an upright head position (25 degrees) can be maintained, a 10 Fr catheter can be used for administering continuous oxygen during larygoscopy via the nasopharynx, at a rate of about 5 L/min and 10cmH2O of positive end-expiratory pressure (PEEP) should be applied during preoxygenation. For prevention of pre-oxygenation induced atelectasis, inspiratory pressure are to be maintained at about 55cmH2O for 10 seconds following the application of 10cmH2O of PEEP [3]. After the airway is secured the inspired oxygen fraction should be reduced and maintained at about 0.4. It is recommended for ventilation in obese patients, lung protective volumes (6-8 ml per kg according to IBW), plateau pressures <30 cms H2O and titration of PEEP according to cardiovascular and respiratory state. Alveolar recruitment maneuvers can also be employed.

The use of anesthetic drugs in obese patients needs consideration with respect to the dosage as it is important to be aware about the fact that the presence of excess fat in obese patients affects the pharmacokinetics of drugs based on their lipid solubility and tissue distribution. The dosing of anaesthetic drugs for obese patients is a major concern during surgeries. Lean body weight (LBW) reflects excess non-adipose tissue of obese patients and can be considerably greater than ideal body weight (IBW), generally peaking at 100 kg for males and 70 kg for females. LBW is ideally used to calculate drug doses, with a few exceptions like: emergency medications such as noradrenaline (norepinephrine) and adrenaline (epinephrine) which are dosed according to IBW, the minimum dose of atropine according to lean body weight, as lower doses can cause paradoxical bradycardia. Use volatile agents with rapid offset of action (low blood:gas partition coefficient) like desflurane and sevoflurane limits its absorption in the adipose tissue, thereby decreasing the incidence of re-sedation which might deteriorate the respiratory function[5].

Fluid management perioperatively is also one of the major concerns as these patients have an increased risk of post operative renal failure as they present with protracted volume. This protracted volume is mainly because of prolonged fasting before surgery or increased urine output secondary to the administration of anti-hypertensive and hypoglycemic drugs. Also, pre-existing renal disease in patients with BMI greater than 50 kg/m2 with physiological changes during laproscopic surgeries after pneumo-peritoneum are predisposing risk factors [3]. Use of perfusion index and pulse pressure variation can help in better management of fluids perioperatively.

Post-surgery, the obese patients possess a higher risk for experiencing respiratory complications like: acute respiratory failure and pneumonia. As lung collapse or atelectasis

occurs more often in obese patients following extubation which takes longer time to resolve causing breathing difficulties. Hence these patients require close monitoring in post operative care unit.

These patients should be kept in head up position and oxygen therapy with Continous positive airway pressure (CPAP) or non-invasive positive pressure ventilation (NIPPV) can be considered after extubation for better outcomes, especially if preoperatively patient had required CPAP. The use of such oxygen therapies is especially beneficial in patients who have received intra operative opioids. These considerations are needed because, it helps in prevention of airway obstruction by ensuring proper ventilation by preventing collapse of the lungs and support better gaseous exchange within the lung. It restores and preserve normal respiratory functions improving the patients breathing and therefore reducing the risk of postsurgical respiratory failure.

Other than respiratory complications, the deep venous thrombosis (DVT), rhabdomyolysis leading to acute kidney injury (AKI) are other concerns that needs consideration.

Conclusion

The occurrence of perioperative complications due to obesity and its associated co-morbidities can be brought down significantly by collaborative efforts taken by anesthesiologist and surgeons by proper preoperative assessment and pre operative optimization of patients especially the cardiovascular a respiratory system. Also, adequate intraoperative measures like: optimal positioning, optimal fluid management, proper choice of anesthetic agents, their route of administration, and their optimal dosage, effective ventilation strategy, prophylaxis for preventing deep vein thrombosis, proper plan of extubating with recruitment maneuvered and reverse Trendelenburg strategies plays a vital role in better patient outcome.

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