# Anaesthetic Implications in Obese Patients: A Case Series

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***Case Report***

***Abstract:*** Across the globe, obesity is a major cause for post-op morbidity and mortality. More people are obese than malnourished, and its second only to smoking as a preventable cause of death**.** Obesity is defined as BMI>30kg/met-square**.** Obesity is a complex and multifactorial diseasebut, in simple terms, occurs when net energy intake exceeds net energy expenditure over a prolonged period of time. However, it is not always easy to identify a single explanation as to why this occurs in some individuals and not others. The various pathophysiological changes in obesity should be taken into consideration for planning anaesthesia. Various physiological changes occurring in all the body systems contribute to problems faced by an anaesthetist. Obesity due to its effect on the body, changes the approach of the anaesthetist while planning anaesthesia to a particular surgery. A thorough understanding of the drug doses, physiological changes and special techniques makes the anaesthesia a comforatable experience for the patient and the anaesthetist. Descriptions of two obese patients anaesthetic management is detailed, focusing on the changes made to the routine practice. One patient is done under regional anaesthesia while other receives general anaesthesia

***Keywords:*** Obesity, Anaesthetic Implications.

## Introduction

Across the globe, obesity is a major cause for post-op morbidity and mortality .More people are obese than malnourished, and its second only to smoking as a preventable cause of death**.(1)** Obesity is defined as BMI>30kg/met-square**.(2)** Obesity is a complex and multifactorial disease**(1)** but, in simple terms, occurs when net energy intake exceeds net energy expenditure over a prolonged period of time. However, it is not always easy to identify a single explanation as to why this occurs in some individuals and not others.BMI of <25 kg $m^{-2}$ is considered normal; a person with a BMI of 25–30 kg $m^{-2}$ is considered overweight but at low risk of serious medical complications, while those with a BMI of >30, >40 and >50 kg $m^{-2}$ are considered obese, morbidly obese and super-morbidly obese, respectively**(3).** Morbidity and mortality rise sharply when the BMI is >30 kg $m^{-2}$.**(4)** Although it is a very robust and practical assessment of obesity, the BMI does have its limitations. For instance, heavily muscled individuals would be classified as overweight. It is now thought that other factors, such as young age and the pattern of adipose tissue distribution, may be better predictors of health risk**.(5)**

## Case 1

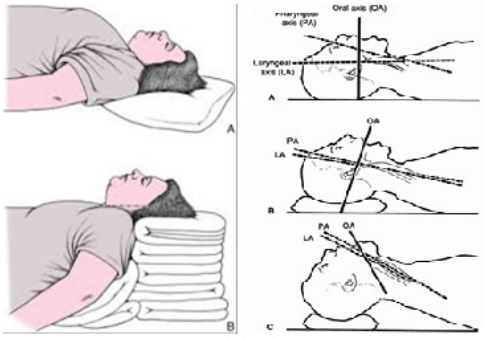
A 45-year-old, 115 kg weight, 154 cm tall male patient was posted for Trans-urethral resection of prostate surgery, the patient had no significant past medical history. Patient had gradually put on weight over ten years. It was dietary in origin and endocrine causes like Cushings syndrome, hypothyroidism, hypogonadism, hypothalamic dysfunction were ruled out. The IBW of the patient was 54 kgs and BMI was 44. Patient had normal mouth opening and neck movements; cardiovascular and respiratory systems were normal on clinical examination. The routine haematological investigations, biochemistry, liver function tests, thyroid function tests and lipid profile were normal. serum electrolytes were within the normal range too. X-ray neck AP, Lateral and indirect laryngoscopy did not reveal evidence of difficult airway intubation. ABG, PFT, oxygen consumption were done to assess the extent of cardiopulmonary derangement and PFT showed moderate restrictive pulmonary function.2d echo showed grade 3 diastolic dysfunction. The patient was morally prepared and informed valid consent was takenexplaningevery aspect to the relatives also. Spine was examined and L4-5 space was palpated. Patient was given 20 mg omeprazole tablet 8 hours before surgery. Anaesthesia trolley was prepared in view of regional, general anaesthesia, difficult intubation and resuscitation. Patient was given subarachnoid block with no. 23G disposable spinal needle in sitting position at L4-5 space with 2 cc. of 0.5% Bupivacaine heavyplus 25 micrograms Fentanyl. Vital parameters were monitored clinically Blood pressure was monitored using a large sized cuff with mercury sphygmomanometer on one arm and automatic sphygmomanometer on the other hand. Within 5 minutes, the sensory level reached T4 simultaneously BP decreased to 70 mm of Hg and pulse to 50/min but SaO2 was normal and patient was comfortable and had normal breathing. Intravenous fluids (rapid) and Inj. atropine 0.6 mg IV were given. Head high was given, as

the drug was not fixed yet. O2 with FiO2 0.4 was started. All these maneuvers helped in restoring pulse and B P to 70/min and 144/ 84 mm of Hg respectively within the next 15 minutes. Surgery was done in lithotomy position, which lasted for about 1 hour. Patient was given 1500 ml of Ringer Lactate and had 150 ml blood loss intraoperatively. Patient was monitored continuously, the records were maintained every 5 min. No sedative or anxiolytic was given, as the patient was comfortable and relaxed. Postoperatively, the patient was given supine position with FiO2, 0.4 Vital parameters were recorded, patient was observed for respiratory obstruction and pain. Effect of subarachnoid block wore off at the end of 4 hours. Early mobilisation was achieved from theevening of the day of surgery,

The photographs have been submitted with the permission of the patient

## Case 2

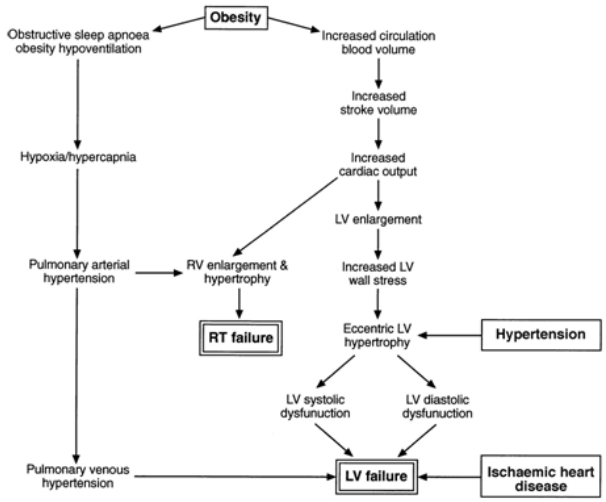
A 36yr old housewife, BMI=36.6 was posted for umbilical hernia repair. General anesthesia was planned with consultation of surgeon and a detailed preop visit revealed that the pt was hypertensive, controlled on medications.pt had a short neck with adequate mouth opening. All the laboratory findings was within normal limits.2D ECHO showed grade 1diastolic dysfunction. She had undergone a caseraen section 2 yrsback, theanaesthetic record of which should an uneventfullcourse. The patient was induced with inj. propofol 130mg and laryngoscopy was attempted by a trained anaesthetist in a RAMP position after adequate pre-oxyegenation.Such position of the patient allows the oral, pharyngeal and laryngeal axis to coincide and makes the laryngoscopy view of the vocal cords easier**(6).**Intraopeartively PEEP was instituted and a ET-CO2 of 25-35 was maintained. Head lowering was avoided and fluids were given to maintain the urine output>0.5ml/kg/hr. Pt was extubated when she was fully awake and after checking adequacy of complete reversal. Multimodal analgesia was given and recovery was in a semi-upright position with oxygen support.



Traditional ramp position for intubation

## Discussion

The various pathophysiological changes in obesity should be taken into consideration for planning anaesthesia. The respiratory changes in these patients are decreased FRC, increased CC to FRC, increased ventilation perfusion mismatch and later pulmonary hypertension. Therefore, hypoxia and hypercarbia should be avoided **(7).** The patient on controlled ventilation should be ventilated at low rate, more tidal volume and adequate expiratory pause. Obese individuals require high FiO2 to achieve adequate oxygenation. Patient should be supplemented with oxygen in case of regional anaesthesiaalso.Head low and head low with lithotomy coud precipitate hypoxia and hypercarbia in the patient.The changes that are expected in the cardiovascular system are: increased blood volume, cardiac output.Ventricular work load, increased oxygen consumption, systemic and pulmonary hypertension and later biventricular failure **[8].** The obese patients are more prone to arrhythmias due to ischemic heart disease, electrolyte imbalance, drugs and sleep apnoea. The cardiovascular responses to various stimuli are of extremes. Thus, they should be fully investigated and monitored.



The other challenges in these patients are of maintaining airway, intubation difficulties, associated diabetes mellitus and acid aspiration. Awake or spontaneous intubation may be required and the patient should not be paralysedwhen difficulty is anticipated.The changes in pharmacokinetics and dynamics of the drugs in obese are due to decreased total body water, increased fat, increased lean body mass, blood volume cardiac output plasma triglycerides and cholesterol and absolute body water. Thus lipophilic drugs require larger inducing doses and have large, volumes of distribution and prolonged elimination Therefore, thiopentone and propofol are required in higher inducing doses (7 and 5 mg/kg LBW resp.) and benzodiazepines are given in usual doses/kg body weight[9].Though the blood volume and therefore the plasma cholinestrase amount is increased. Succinylcho-line upto 120-140 mg is adequate in most of the obese patients. Water-soluble non depolarising muscle relaxants like pancuronium, vecuronium and atracurium are given in same doses per kg body weight but neuromuscuiar blockade should be monitored.(10) The obese patients metabolise halothane and enflurane to a greater extent than non obese leading to higher fluoride levels. High serum bromide levels and halothane hepatitis are more common in obese patients[2],[5],[6].Regional anaesthesia not interfering with the cardiovascular status of the patient is preferred[11],. The doses of local anaesthetics should be reduced by about 25% for subarachnoid and epidural blocks in obesity. If the level goes above T4 intensive cardiorespiratory monitoring should be done. Regional analgesia like epidural analgesia with light general anaesthesia may have several advantages like cardiovascular stability adequate oxygenation, reduced doses of narcotics or inhalation agents[12] and most imporatantly avoiding airway handling. Technical difficulties may be faced during regional analgesia-difficult anatomy palpation,positioning etc. Postoperative consideration should be given to hypoxia, positioning, fluid intake - output, chest physiotherapy and incentive spirometry, deep vein thrombosis, and early ambulation.

## References


1. Millers anaesthesia,7th edition,chapter 64,pg 2089
2. Oxford handboof of anaesthesia,3rd edition pg188
3. Abrams B, Parker J. Overweight and pregnancy complications. Int J Obes1988; 12: 293–303
4. Agarwal N, Shibutani KJ, SanFilippo JA, Del Guercio LRM. Hemodynamic and respiratory changes in surgery of the morbidly obese.Surgery1982; 92: 226–34
5. Alauddin A, Meterissian S, Lisbona R, MacLean LD, Forse RA. Assessment of cardiac function in patients who were morbidly obese.Surgery1990; 108: 809–20
6. Alexander JK, Peterson KL. Cardiovascular effects of weight reduction.Circulation1972; 45: 310–8
7. Alpert MA, Singh A, Terry BE. Effect of exercise on left ventricular function and reserve in morbid obesity.Am J Cardiol1989; 63: 1478–82.
8. Stolting RK. Anaesthesia and co-existing diseases. pp 541-546.
9. Buckley FP. Anaesthesia for morbidly obese patient. Can J of Anaesthesia 1994/41; 5/pp R: 94-100.
10. Shenkman Z. Preoperative management of the obese patient. Br J of Anaesthesia 1993; 70:349-359.
11. Fox GS. Anaesthesia for morbidly obese Br J of Anaesthesia 1981; 53:811-816.
12. Hanrem CW. The implications of MO for anaesthesiaAnaesthesiology Review. 1979; 6:29-35.